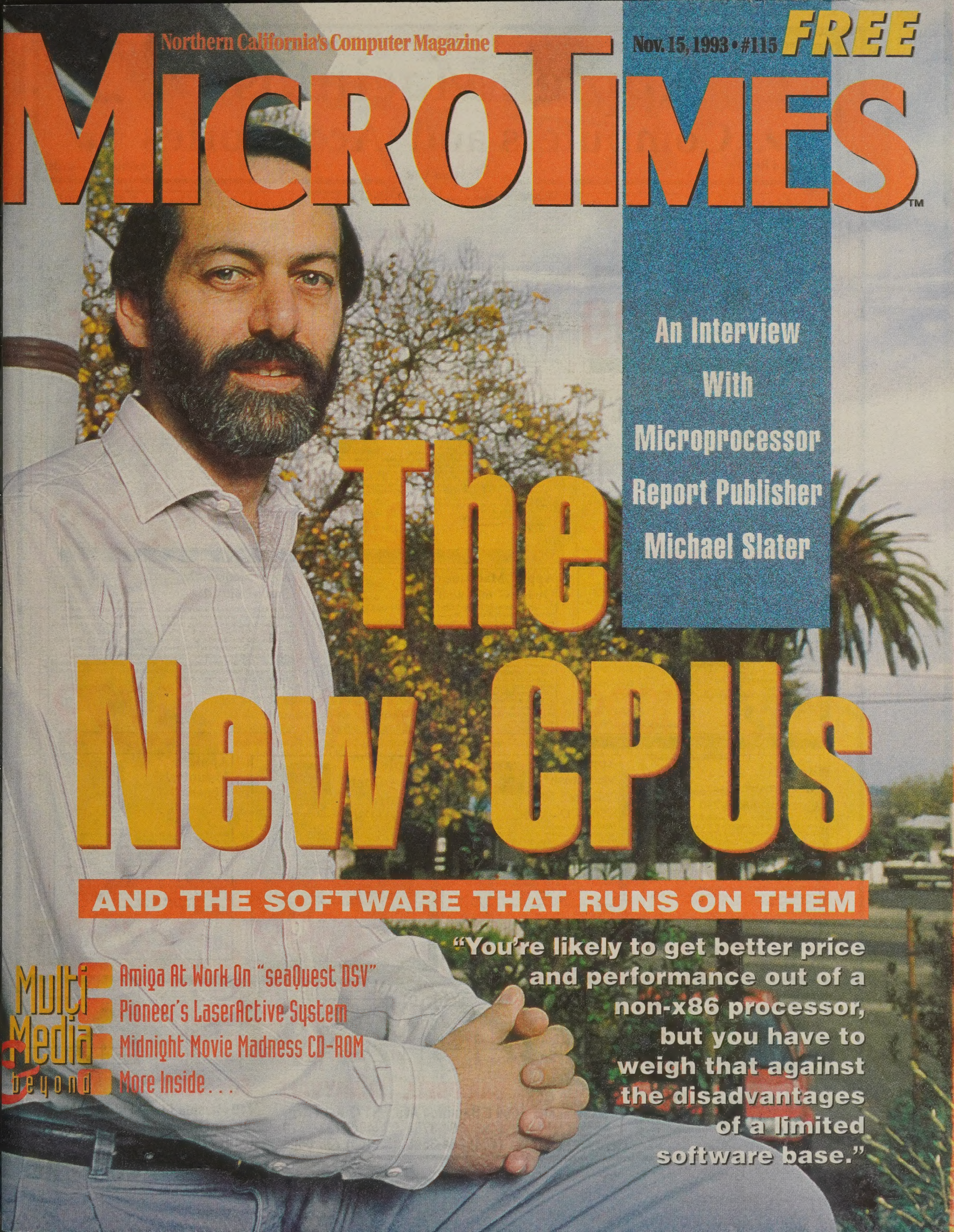
Northern California's Computer Magazine

Nov. 15, 1993 • #115 FREE

MICROTIMES™



An Interview With Microprocessor Report Publisher Michael Slater

The New CPUs

AND THE SOFTWARE THAT RUNS ON THEM

"You're likely to get better price and performance out of a non-x86 processor, but you have to weigh that against the disadvantages of a limited software base."

Multi Media & beyond

- Amiga At Work On "seaQuest DSV"
- Pioneer's LaserActive System
- Midnight Movie Madness CD-ROM
- More Inside . . .

Apple® Macintosh® Computers and Accessories

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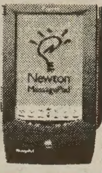
Newton™ MessagePad™



Introducing the Newton™ MessagePad™ communications assistant from Apple Computer, Inc. Newton makes it easy to communicate and organize information.

- Built-in calendar, address book, notepad and communications capabilities
- Lets you send a fax, receive a page, print and "beam" to another Newton*
- Send and receive electronic mail
- Works with PCs and Apple® Macintosh® computers*
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*Message Card and Newton Connection software sold separately.

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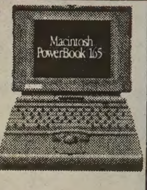
Apple PowerBook Duo 230 4/120	$350
Apple PowerBook Duo 230 4/80 bundle (with floppy adapter and external disk drive)	$350
Apple PowerBook Duo 230 4/160 bundle (with Apple Duo Dock and Express modem)	$500
Apple Duo Dock	$150
Apple Duo Dock w/ 230MB Hard Drive	$300
Apple Mini Dock	$100
Apple Color Printer	$300
Macintosh 16" Color Display	$200

Apple® Macintosh® PowerBook™ 165 4/80



The PowerBook™ 165 delivers the processing speed, flexibility, and convenience you need all in a package that weighs just seven pounds and fits into a briefcase. You can also connect to a larger display for more work space.

#1833715

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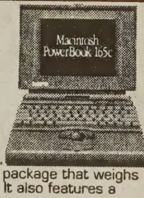
Apple® Macintosh® Color PowerBook™ 165c 4/120



With the PowerBook™ 165c, the impact and appeal of a bright, vivid color display is now available on a portable Macintosh computer. It delivers the processing speed, flexibility, and convenience you need all in a package that weighs just seven pounds and fits into a briefcase. It also features a backlit passive-matrix display that gives you 256 brilliant colors. You can also connect to a larger display for more work space.

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Apple® Macintosh® PowerBook Duo™ 250 4/200

For users looking for light weight and small size in a powerful notebook computer, the Apple® PowerBook Duo™ System is an excellent choice. The PowerBook Duo offers high-speed processors, active matrix screens, large RAM expansion, and desktop expansion—features normally found only on much larger, heavier systems—all in a package that weighs less than 5 pounds. The PowerBook Duo 250 is part of Apple's acclaimed PowerBook family of lightweight, compact, and flexible notebook computers. Featuring a 68030 microprocessor that runs at 33 megahertz, the PowerBook Duo 250 is more powerful than many desktop computers. It supports up to 24 megabytes of RAM, so you can work with multiple applications simultaneously.

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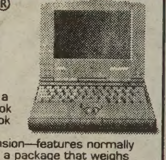
Apple® Macintosh® PowerBook Duo™ 270c 4/240



For users looking for light weight and small size in a powerful notebook computer, the Apple® PowerBook Duo™ System is an excellent choice. The PowerBook Duo offers high-speed processors, active matrix screens, large RAM expansion, and desktop expansion—features normally found only on much larger, heavier systems—all in a package that weighs less than 5 pounds. The PowerBook Duo 270c is Apple's top-of-the-line color PowerBook Duo computer and is the industry's first 16-bit color notebook. Its 8.4-inch, backlit, active-matrix display lets you work with your files in thousands of colors, providing the best screen image, performance and color available in a notebook computer. Yet the PowerBook Duo 270c weighs just 4.8 pounds and fits easily into a briefcase.

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Macintosh Color Classic

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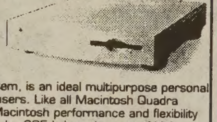

The Apple® Macintosh® Quadra™ 605 personal computer, Apple's most affordable high-performance desktop system, is an ideal multipurpose personal computer for business and professional users. Like all Macintosh Quadra computers, it puts the highest levels of Macintosh performance and flexibility at your fingertips. Yet the Macintosh Quadra 605 brings the cost of high performance down to almost any budget, and its new, slimline design saves desk space. The Macintosh Quadra 605 uses the powerful 680LC40 processor, so you can scroll, search, and sort through your applications faster than ever before. You'll also appreciate the speed with which the Macintosh Quadra 605 redraws graphics, recalculates spreadsheets, and reformats large documents. It comes with 4 megabytes of RAM on board, expandable to 36, so you can work with multiple applications simultaneously.

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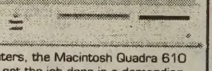
Apple® Macintosh® Quadra™ 610 8/230



Like all Apple® Macintosh® Quadra™ computers, the Macintosh Quadra 610 delivers the high performance you need to get the job done in a demanding environment. It offers the flexibility to meet your needs today, and the room to grow tomorrow. Based on the fast, 25-megahertz Motorola 68040 processor, the Macintosh Quadra 610 provides affordable high performance. It comes with 8 megabytes of RAM and an integral math coprocessor. In addition, you can expand memory to up to 68 megabytes when you want to add horsepower for sophisticated graphics and multimedia applications as well as mainstream business programs. The Macintosh Quadra 610 even provides high-speed Ethernet support on-board.

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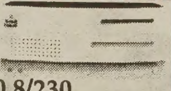
Apple® Macintosh® Quadra™ 650 8/230



If you've been waiting for a high-performance computer that's easy to expand, welcome to the Apple Macintosh Quadra 650 computer. As one of our most powerful personal computers, the Macintosh Quadra 650 is a good choice if you need a computer that's built for speed, designed for flexi-bility, and capable of growing with you. Based on the fast, 33-megahertz Motorola 68040 processor, the Macintosh Quadra 650 provides affordable high performance. It comes with 8 megabytes of RAM and an integral math coprocessor. For increased performance, you can expand memory to up to 136 megabytes.

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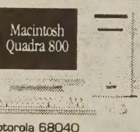
Apple® Macintosh® Quadra™ 800 8/500 CD



With its fast, 33-megahertz Motorola 68040 microprocessor, accelerated graphics architecture, and improved SCSI and NuBus capabilities, the Macintosh® Quadra™ 800 runs applications 30 percent faster than the Quadra 700. The Macintosh Quadra 800 gives you unique, built-in capabilities for fast and direct access to the resources you need. For photographic quality images and QuickTime movies with lifelike color, you can upgrade the Quadra 800 to display more than 32,000 colors on the same 16-inch display. If you need to share information in a high-speed network, the Quadra 800 comes with built-in Ethernet. *Monitor & Keyboard Extra*

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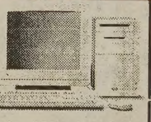

To put it simply, the Apple® Macintosh® Quadra™ 840AV computer is the most powerful, feature-rich system Apple has ever built. With an innovative architecture that delivers exciting new capabilities in telecommunications, video, and speech, the Macintosh Quadra 840AV helps you communicate more effectively than ever before. The Macintosh Quadra 840AV combines the raw horsepower of a 40-megahertz 68040 microprocessor with a 66-megahertz digital signal processor (DSP) to achieve outstanding performance. The DSP handles telecommunications, speech, and audio functions, allowing the 68040 processor to perform other tasks, thereby increasing the total system performance. Monitor and Keyboard not included.

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With an innovative architecture that delivers new capabilities in telecommunications, video, and speech, the Apple® Macintosh® Centris™ 660AV computer helps you work and communicate more effectively than ever before. The Macintosh Centris 660AV combines the horsepower of a 25-megahertz 68040 microprocessor with a 55-megahertz digital signal processor (DSP) to achieve outstanding performance. The DSP handles telecommunications, speech, and audio functions, allowing the 68040 processor to handle other tasks, thereby increasing the total system performance. Monitor and keyboard not included.

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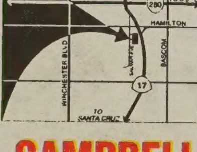

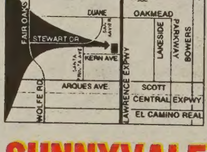

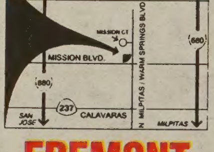

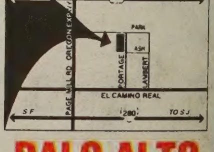

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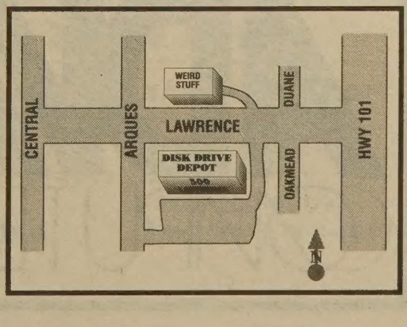

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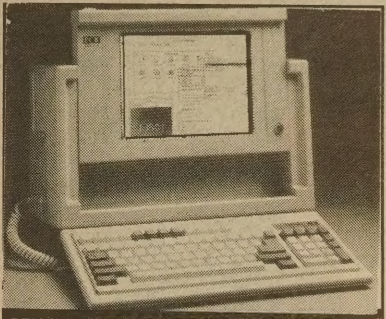

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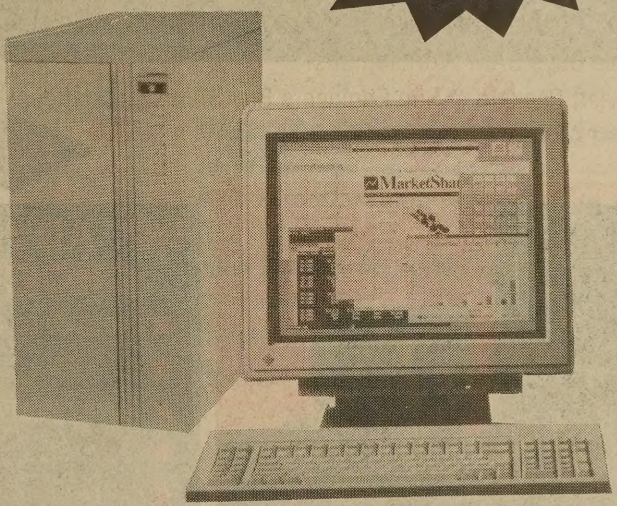

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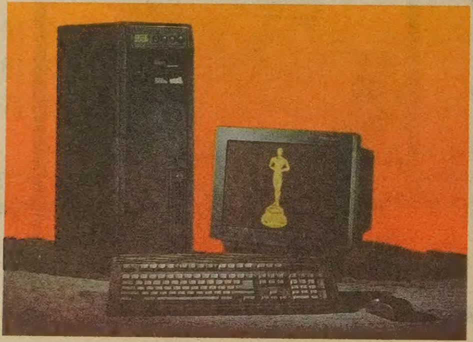

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A NOTE FROM THE EDITORS

Will the Intel-Microsoft domination of the desktop continue forever? Will the emerging operating systems and RISC-based chips bring amazing new productivity breakthroughs or bring a return to chaos not seen since the days of the Seequa Chameleon?

Michael Slater, editor-in-chief and publisher of *Microprocessor Report*, has been observing and analyzing the silicon-and-software scene for a demanding technical audience since 1987. In this month's cover story, we see what he thinks of the industry's current state and its implications for users and vendors alike.

—ME

MICRO MARKET PLACE
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COVER STORY

The New CPUs
And The Software That Runs On Them

An Interview With *Microprocessor Report* Publisher Michael Slater

By Mary Eisenhart 72

Cover Photo: Michael Jay

If you're trying to make sense of Pentium vs. PowerPC vs. Alpha vs. Sparc vs. MIPS, you're not alone. As the standards of the last ten years age, a host of contenders are challenging Microsoft and Intel, with varying degrees of success. If your work depends on understanding these trends, you'll probably find Michael Slater's insights very useful.

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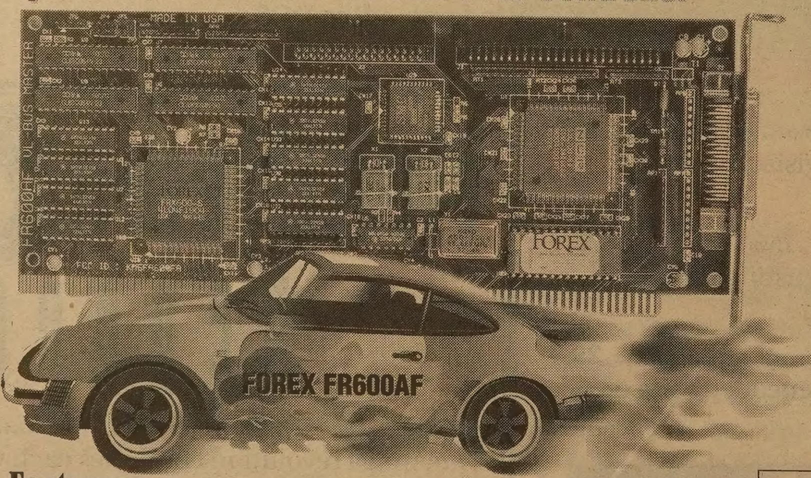

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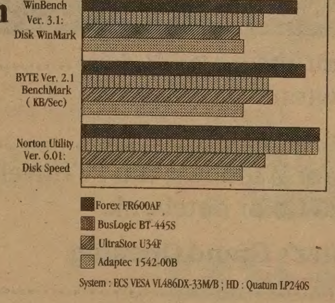

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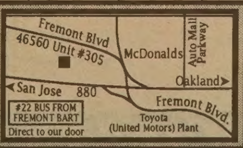

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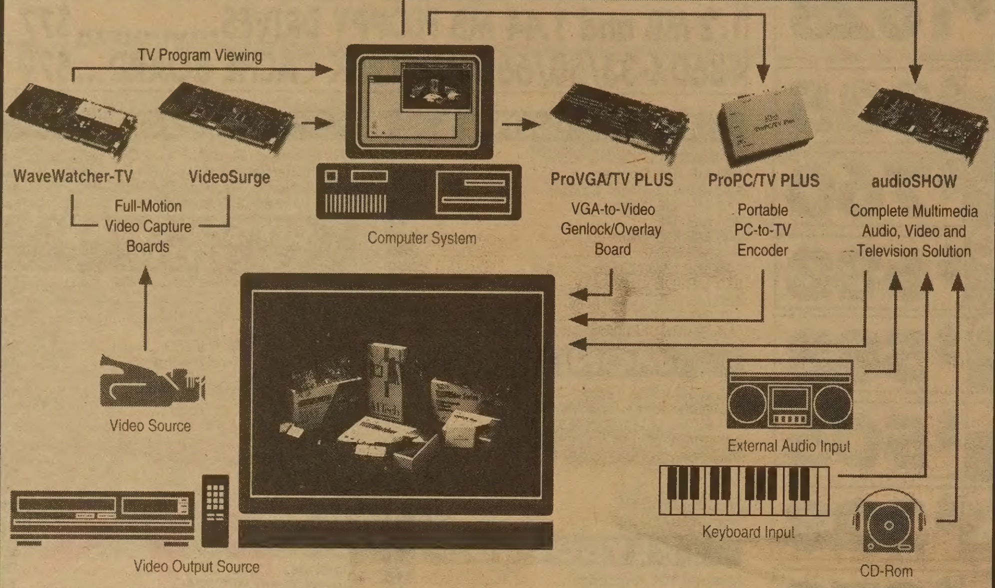

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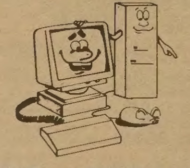

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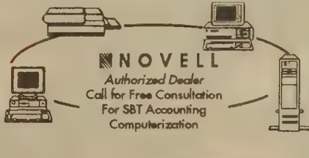

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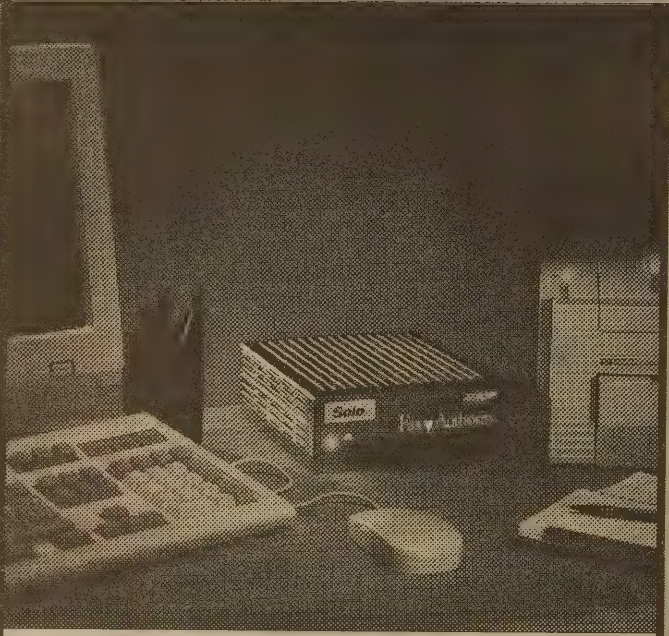

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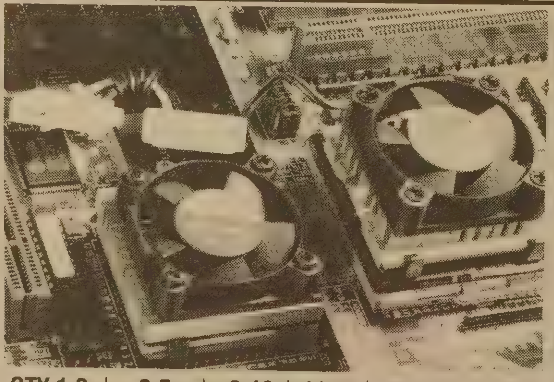

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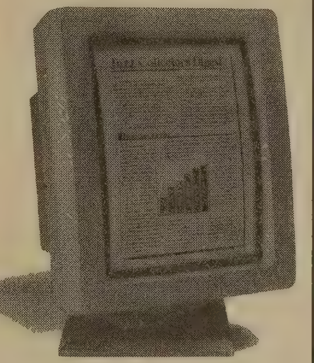

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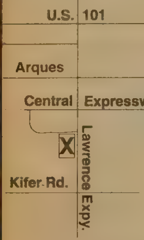

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INDUSTRY INSIGHT

Digital Highways, Novell DOS, Apple In The Software Business Bell Atlantic And TCI To Merge

BY PAUL HOFFMAN

Copyright © 1993 by Paul Hoffman. All rights reserved. Paul Hoffman is an industry analyst who has been covering microcomputer technology for ten years. He can be reached on Internet (phoffman @well) or CompuServe (71545,346). He also writes popular microcomputer books.

In a move that shows the growing importance of information delivery in the computer industry, media giant Tele-Communication Inc. (TCI) will merge with Bell Atlantic, the telephone provider for the mid-Atlantic states. The deal, one of the largest mergers in the history of the US, will create a giant company that can provide both information and access to that information to almost half of the country.

Both companies have been actively pursuing advanced technologies for bringing more than just television and telephone signals to homes and businesses, and the merger will most likely accelerate their entries into these markets.

The implications for computer users of this merger, and other similar mergers that are sure to follow in the coming years, are huge. Currently, most microcomputers are used to process information that was generated on the computer (such as data entered in a spreadsheet) or information that was generated within the company, usually retrieved over a network. CD-ROMs, touted as an easy method to make gigabytes of information accessible at very low cost, have not caught on nearly as well as was predicted five years ago. For people who have bought CD-ROM drives, the information content of the disks available has been limited, and even the best-selling titles have sold only one-tenth as well as regular software.

The Bell Atlantic-TCI merger could significantly change the way people get their information. The two companies already own low-bandwidth pathways to homes and businesses all over the country. As the merged company switches these to fiber-optic cable in the next few years, it can offer its subscribers gigabytes of information a day at almost no cost to itself. This information could be on a demand basis—you request particular titles just as you request pay-per-view movies—or the company could broadcast free data based on a schedule, similar to the way cable-only channels operate. Bell Atlantic already has much of the needed broadcast technology, and TCI brings its years of marketing and billing experience.

For example, you could subscribe to a newspaper channel that would download the entire newspaper (or only the sections you want to pay for) each day, possibly updating it throughout the day. As an inducement to subscribe to its newspaper, one "channel" on the cable could be a free newspaper that just has the front page and a few local columns; the pay channel would be the full newspaper.

> **The Bell Atlantic-TCI merger could significantly change the way people get their information.**

Another possibility would be an all clip-art channel: contributors or quality clip-art could get six months free. Due to Bell Atlantic's business in simple phone connections, access to the Internet and other for-fee services will likely be a big part of the grand scheme. Of course, there would also be an increase in pure entertainment television programming as well, with greater two-way interaction on choosing programs to be watched.

Many microcomputer manufacturers have come to understand the home computer market as really three overlapping markets: small business, entertainment, and education. Of these, small business and personal word processing have a much larger share than was expected. These users will probably be very interested in the ability to connect with others across the Internet. They will also be interested in services such as online reference material, discount business supplies, and so on.

The all-stock deal, in which Bell Atlantic buys all of TCI's stock, is estimated to be worth over $20 billion. The companies emphasized that the main advantage of the merger is that the resulting company could be more responsive to the individual subscriber, something that neither telephone companies nor cable companies are known for. Depending on how well the corporate cultures work together, the merger could set the tone for how people look at information and entertainment delivery in the latter half of the decade.

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integrated Novell DOS v7 within a month. The software, a replacement for Microsoft's MS-DOS v6, is not expected to take the computer market by storm, but will enhance Novell's position in the networking world by providing a more flexible operating system with low-end networking built in. For companies that are already committed to Novell's NetWare, it will be an attractive alternative to MS-DOS for many users.

The operating system has some major features lacking in the current versions of MS-DOS, such as pre-emptive multitasking of programs and automatic sharing of network resources. Pre-emptive multitasking allows you to run more than one program at a time and change the priority of the tasks that are running in the background. For example, if you are using a database management system and a communications program at the same time, neither stops when it is put in the background, allowing long tasks to take place without hogging the whole system. This is currently available to MS-DOS users who buy an additional program like Quarterdeck's DESQview. The automatic sharing of resources lets all users access disks and printers within a workgroup with almost no effort.

One of the features sure to endear Novell DOS to corporate managers is that it allows old low-end systems, even those based on the 8088, to share resources.

One of the features sure to endear Novell DOS to corporate managers is that it allows old low-end systems, even those based on the 8088, to share resources. Many corporations with budget problems would like to avoid buying new computers just to keep them on the company network, and Novell DOS will make that possible. While Microsoft's Windows has virtually abandoned all computers with a CPU less powerful than a 386SX in them, Novell hopes to rope in new customers by supporting older PCs.

APPLE JUMPS INTO MAC/PC SOFTWARE RETAIL MARKET

Following the lead of Dell and Gateway 2000, Apple will begin to sell software manufactured by others as a part of its daily business. Instead of relying on print ads and catalogs, however, Apple will ship the software on free CD-ROMs. To purchase the software, you call a toll-free telephone number and give them a credit card number; the operator then gives you a software access key that unlocks the software and lets you copy it to your hard disk.

Apple has long been one of the strongest proponents of CD-ROM technology, and a relatively high percentage of Macintosh users have a CD-ROM player. By providing the CD-ROM for free, Apple gains a great deal of marketing clout over standard software retailers who rely on print advertising and direct mail.

Apple is also providing a great deal of pre-sale information on the CD-ROM including demonstration versions, interactive tours, and product sheets. Most retail stores only provide data sheets for software and usually cannot demonstrate the software; mail order companies usually will not even provide data sheets.

The main disadvantage of Apple's program, called Software Dispatch, is that you do not get printed documentation with the software. On the other hand, you do get electronic versions of the documentation with hypertext links, and you can print the

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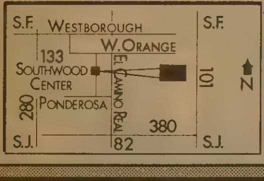

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documentation if you wish. The documentation uses Apple's DocViewer software, which has been praised by Apple developers as Apple has switched much of its technical documentation to DocViewer format. Users who have begged for online versions of an entire manual instead of just the quick reference that most programs provide may flock to Software Dispatch just for the documentation. Of course, these users had better have a lot of hard disk space to spare for the manuals. Apple says that some of the manuals will be able to be purchased separately as well.

Apple is not the first to announce CD-ROM delivery of software, but it will probably be among the first to ship. The first disk will be for Macintosh users; Apple says that it will release a CD-ROM of Windows software early next year. The Macintosh disk will contain over fifty applications and clip-art packages from major software companies such as Claris, Symantec, and Intuit. To order the free CD-ROM, call Apple at 1-800-937-2828, extension 600.

NOVELL TRANSFERS UNIX TRADEMARK TO X/OPEN

Hoping to reduce the factionalism in the UNIX marketplace, Novell transferred the UNIX trademark to a standards group that will enforce brand-name specifications. The move should make it easier for users to know what is and is not standard UNIX in the future. X/Open is an independent open systems organization based in London that has garnered a great deal of support around the world for its testing and specification suites.

Novell purchased AT&T's UNIX System Laboratories (USL) earlier this year in hopes of expanding its already-large share of the networking market. That move scared many UNIX vendors with whom Novell hoped to work, but transferring the UNIX specification to an independent group should allay most of those fears. X/Open has a stronger following outside the US, but many American manufacturers have followed its guidelines for making their software interoperable.

By controlling the trademark, X/Open will be able to say who is and is not running true UNIX. They have committed to produce a full set of tests for conformance to the UNIX base. It is not clear what X/Open will do to companies who do not conform to the tests, particularly companies that are not official members of X/Open. However, since most UNIX hardware manufacturers want to at least appear to be following standards, it is likely that most will conform as fully as possible.

Novell's move gives the company new credibility in the UNIX marketplace. While many manufacturers fight for slices of the hardware market, Novell wants to be sure that as many systems as possible support Novell's networking. Although they will continue to sell their own version of UNIX, it is even more important to them that they stay on top of the networking market regardless of whether the file server is running NetWare or UNIX. ■

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MICROTIMES STOCK INDEX POSTS IMPRESSIVE GAINS

Throughout the month-long trading session, computing stocks performed well despite the sell-off of economically sensitive concerns. Most computing stocks posted earnings for the third quarter above analysts' estimates, which in turn, helped the MicroTimes Stock Index rise 260.47 points, or 6.18%, before closing at 4473.13.

The Dow Jones Industrial Average also traveled in a northerly direction during the period, increasing 29.06 points, or .8%, en route to a closing mark at 3642.31. The NASDAQ Composite performed second only to the MicroTimes Stock Index upticking 42.80 points, or 5.78%, before closing at 782.91.

TURNING TO COMPUTING CONCERNS:

Motorola Inc. garnered the largest dollar gainer honor for the period, as that concern added $14.13, or 15.4%, onto its price before reaching a closing price of $105.88. In a recent news release, Motorola announced earnings for the third quarter ended October 2, 1993, and they read as follows: net income increased 100% to $254 million from $127 million recorded one year ago. Shares of Motorola traded 5% higher on October 11 because of the higher-than-expected earnings.

Apple Computer Inc. was another gainer in the accompanying chart, increasing $3.13, or 12.38%. Apple closed at $28.38. Apple disclosed that fourth-quarter earnings decreased to $2.7 million, or 2 cents a share, from $97.6 million or 81 cents a share, recorded in the same quarter one year ago. Revenue jumped to $2.14 billion, a new record, from $1.76 billion one year ago. Despite the decrease in earnings, Apple's fourth-quarter results were better than the 3-cent loss expected by analysts.

LSI Logic Corp., a Fortune 500 supplier of high-performance semiconductors, announced third-quarter revenues were 19% higher at $184 million from $154 million recorded one year ago. LSI achieved a new record net income figure of $14.4 million up from a year ago loss of $111 million. According to Chairman and Chief Executive Officer Wilfred J. Corrigan, "The financial turnaround has been achieved by increased revenues, higher factory utilization, and lower operating expenses." Despite the increased income, LSI Corp. fell $2.63, or 14.89%, before finally coming to a closing price of $15.00.

Advanced Micro Devices Inc. was the largest percentage and dollar loser of the lot last month, as the concern plummeted $9.25, or 31.94%, before bottoming out at $20.13. Advanced Micro Devices recently reported third-quarter earnings of $61.3 million versus $64.4 million recorded one year ago, a decline of 4.7%. Separately, Advanced Micro Devices' rating was cut at Merrill Lynch to intermediate "neutral" from "above average." ■

EXCH	COMPANY	TICKER SYMBOL	CLOSING PRICE 09/17/93	CLOSING PRICE 10/18/93	NET CHANGE IN MONTH	PERCENT CHANGE IN MONTH	P/E RATIO	ANNUAL DIVIDEND RATE	ANNUAL DIVIDEND YIELD	ANNUAL HIGH	ANNUAL LOW
	SOFTWARE										
OTC	Adobe	ADBE	16.50	22.88	6.38	38.64	21	0.20	0.87	37.00	14.00
OTC	Aldus (H)	ALDC	19.25	23.88	4.63	24.03	92	0.00	0.00	23.88	11.75
OTC	Autodesk	ACAD	48.13	47.50	−0.63	−1.30	21	0.48	1.01	56.75	38.75
OTC	Borland (L)	BORL	14.00	15.50	1.50	10.71	–	0.00	0.00	35.00	12.75
OTC	Informix	IFMX	18.50	21.25	2.75	14.86	28	0.00	0.00	27.25	12.00
OTC	Lotus (H)	LOTS	38.25	47.00	8.75	22.88	50	0.00	0.00	50.75	17.50
OTC	Microsoft	MSFT	76.00	83.00	7.00	9.21	26	0.00	0.00	98.00	70.38
OTC	Novell (L)	NOVL	19.00	19.13	0.13	0.66	–	0.00	0.00	35.25	17.00
OTC	Oracle (H)	ORCL	52.63	64.25	11.63	22.09	56	0.00	0.00	64.50	18.88
OTC	Software Publishing	SPCO	6.75	7.13	0.38	5.56	–	0.00	0.00	14.50	5.50
OTC	Symantec (H)	SYMC	18.25	20.00	1.75	9.59	–	0.00	0.00	20.50	8.75
	HARDWARE										
OTC	Apple (L)	AAPL	25.25	28.38	3.13	12.38	20	0.48	1.69	65.25	22.00
OTC	AST Research	ASTA	15.25	17.25	2.00	13.11	–	0.00	0.00	24.25	12.75
NYS	Commodore	CBU	3.25	3.25	0.00	0.00	–	0.00	0.00	9.25	2.50
NYS	Compaq (H)	CPQ	57.63	63.38	5.75	9.98	15	0.00	0.00	63.38	38.13
NYS	Digital Equipment	DEC	38.63	36.50	−2.13	−5.50	–	0.00	0.00	49.25	30.38
OTC	Dell	DELL	17.00	18.88	1.88	11.03	–	0.00	0.00	49.88	13.50
NYS	Hewlett–Packard	HWP	67.88	73.00	5.13	7.55	19	1.00	1.37	89.25	53.75
NYS	IBM	IBM	43.38	44.00	0.63	1.44	–	1.00	2.27	70.25	40.63
NYS	Silicon Graphics (H)	SGI	38.50	45.13	6.63	17.21	37	0.00	0.00	45.50	20.38
OTC	Sun Microsystems (L)	SUNW	26.00	24.13	−1.88	−7.21	15	0.00	0.00	41.00	21.13
NYS	Xerox (L)	XRX	71.75	73.63	1.88	2.61	–	3.00	4.07	88.88	69.88
NYS	Tandy (H)	TAN	35.88	37.75	1.88	5.23	21	0.60	1.59	39.38	24.63
	CPU'S										
NYS	Advanced Micro Devices	AMD	29.38	20.13	−9.25	−31.49	8	0.00	0.00	32.88	12.88
OTC	Intel (H)	INTC	64.25	63.00	−1.25	−1.95	15	0.20	0.32	74.50	31.13
NYS	LSI Logic	LSI	17.63	15.00	−2.63	−14.89	–	0.00	0.00	19.25	6.25
NYS	Motorola (H)	MOT	91.75	105.88	14.13	15.40	34	0.44	0.42	105.88	47.06
	COMMUNICATIONS										
NYS	AT&T	T	59.25	59.13	−0.13	−0.21	20	1.32	2.23	65.00	41.00
NYS	BellSouth Corp.	BLS	61.75	61.88	0.13	0.20	19	2.76	4.46	62.88	46.75
OTC	MCI	MCIC	28.50	28.00	−0.50	−1.75	23	0.04	0.14	29.88	16.81
NYS	Northern Telecom	NT	25.63	27.63	2.00	7.80	–	0.36	1.30	46.00	21.38
NYS	Pacific Telesis	PAC	54.63	54.63	0.00	0.00	26	2.16	3.95	56.50	39.50

KEY: NYS = NEW YORK ASE = AMERICAN OTC = OVER THE COUNTER
(H) = NEW HIGH REACHED IN PERIOD (L) = NEW LOW REACHED IN PERIOD

MARKET DIARY:

ADVANCES	22
DECLINES	8
UNCHANGED	2
NEW HIGHS	9
NEW LOWS	5

MOST ACTIVE ISSUES:

LARGEST DOLLAR GAINER	Motorola	$	14.13
LARGEST DOLLAR LOSER	Advanced Micro Devices	$	−9.25
LARGEST PERCENTAGE GAINER	Adobe		38.64 %
LARGEST PERCENTAGE LOSER	Advanced Micro Devices		−31.49 %

	CLOSE 09/17/93	CLOSE 10/18/93	NET CHANGE IN MONTH	PERCENT CHANGE IN MONTH
MICROTIMES STOCK INDEX	4212.67	4473.13	260.47	6.18
DOW JONES INDUSTRIAL AVERAGE	3613.25	3642.31	29.06	0.80
STANDARD & POOR'S 500 STOCK INDE	458.83	468.42	9.59	2.09
N.Y.S.E. COMPOSITE	254.66	260.00	5.34	2.10
NASDAQ COMPOSITE	740.11	782.91	42.80	5.78

CLOSING QUOTES FOR GRAPH:

DATE	MICRO TIMES	DOW JONES
04/01/93	4196.89	3439.44
04/29/93	4074.63	3425.12
05/27/93	4554.50	3554.83
06/24/93	4266.52	3490.61
07/22/93	4072.42	3525.22
08/23/93	4264.70	3605.98
09/17/93	4212.67	3613.25
10/18/93	4473.13	3642.31

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APPLE® MACINTOSH QUADRA® 650, 8/230	$2249
APPLE® MACINTOSH QUADRA® 650, 8/230/CD	$2581
APPLE® MACINTOSH QUADRA® 650, 8/500/CD	$3141
APPLE® MACINTOSH® IIVX/4/80	$925
APPLE® MACINTOSH® IIVX/5/80/CD	$1184
APPLE® MACINTOSH® IIVX/4/230	$1246
APPLE® MACINTOSH® IIVX/8/230	$1389
APPLE® MACINTOSH CENTRIS™ 610, 4/80	$1019
APPLE® MACINTOSH CENTRIS™ 610/4/80,ENET	$1019
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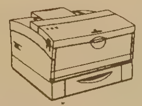
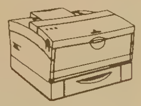

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Free Online Access
To California Legislation And Laws, Now Mandated By Law

BY JIM WARREN

These columns concern the future. This one concerns the future of computer-assisted public access to the process of our governance—which will begin within two months. Without charge by the state. Now guaranteed by law!

AB1624 SIGNED

The night of October 11th, the last day he could act, Governor Pete Wilson signed Assembly Bill 1624 into law. Like most of the eleven hundred-plus bills passed by the Legislature in 1993 that the Governor signed, it will take effect January 1, 1994.

FIRST IN THE NATION

This appears* to be the first time that, mandated by law, *comprehensive* information about state laws and legislation in process have been made available by a state via the nonproprietary public computer networks—especially without charging fees.

REALIZABLE FANTASIES

**Note: Hawaii has offered such information via an expensive, tax-underwritten, isolated state network, and I just heard they're now accessible by telnet (permission requirements, if any, unknown). I also just heard that Washington State began this year making bill-text available over the Internet, but don't yet know what other (essential) information is included, nor whether it's mandated by law or merely by momentary policy whim, easily constricted or withdrawn.*

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TIMELY ACCESS

AB1624 will permit access to legislative details in time to participate in the process of our governance—not just gripe about the results, after the fact. Until now, such statewide participation was simply not practical using snailmailed copies of quickly obsolete printed legislative information.

USEFUL FORM

Legislative data arriving in computerized form can be:

- Automatically monitored for *all* "interesting" words and phrases;
- Quickly searched for *all* specified topics and subjects;
- Indexed, hyperlinked, and cross-referenced to other related information;
- Linked to personal or proprietary data; filed however personally desired;
- Excerpted, processed, and forwarded to others, quickly and accurately.

And—oh yes—folks can also read it.

GLOBAL ACCESS

Using the public global networks provides Californians temporarily out of state—and anyone else interested—with equal access to up-to-the-moment legislative and statutory records. It also gives other states' legislators, legislative staff, and federal legislators fast, easy access to current California legislation and statutes—often used as models by other states and Congress.

MODEL FOR OTHER STATES

AB1624 can be used as a model by citizen-activists and legislators of other states willing to encourage open democratic processes. (I expect to publish some suggested improvements, as well as nuts-'n'-bolts details about how any generic legislative/political process works and how anyone can use the nets to effectively advocate public-interest law, including legislation like AB1624.)

FIRST(?) EXAMPLE OF "NET POWER"

Finally, this appears (please let me know if you know of other instances) to be the first time online advocacy and network-assisted citizen action was *instrumental* in structuring and obtaining the passage of legislation. (However, there have been several instances where net action *halted* undesired legislation or regulations—e.g. FBI-desired prohibitions on secure cryptography, proposals for modem taxes, etc.)

I first heard of bill-author Debra Bowen's original skeleton bill—which had no implementation language—shortly after she introduced it. When I contacted her office, they thanked me for my interest but said the bill was effectively dead because (1) Legislative Data Center staff had said it would cost millions to implement, and (2) they hadn't found any public support for it.

I assured them there was an almost-free way of implementing it using the Internet (what's that?), and went online that night, broadcasting details and a call for citizen action and support.

Both Bowen and Winkley have said that this net-based information, advocacy, and time-sensitive action-alerts were instrumental in the bill's resurrection, progress, and passage.

I detailed an implementation in a 16-page report to legislators, shortly after the bill's first committee hearing. (Paper-only copy available: Send 9"x12" SASE with postage for 5 oz.—$1.21, this week.)

And it was the option of using a low-cost file-server (I offered a donor machine if they couldn't afford one) and the almost-free public networks that made the costs near-

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ONE STEP AHEAD

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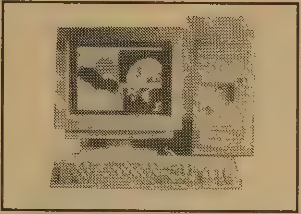

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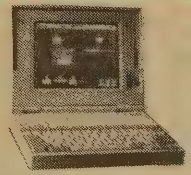

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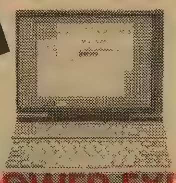
AST RESEARCH INC.



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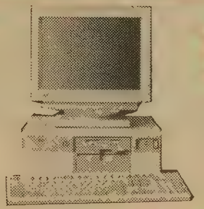

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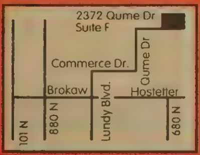

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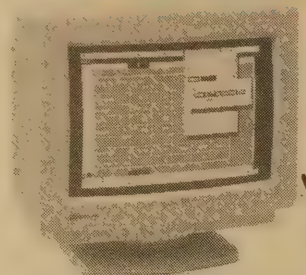

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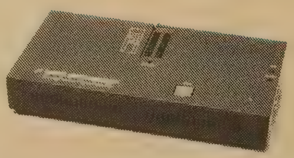

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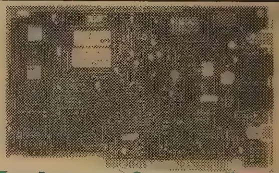

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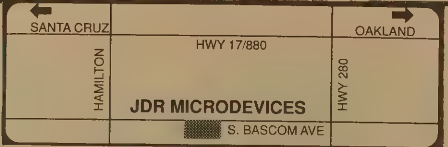

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nil—so much so that *no* additional funds were authorized to implement this service.

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IT'S THE LAW—AB1624 TEXT

These are the key parts of AB1624 as it was signed into law (necessarily hand-rekeyed for the last time!; bracketed notes are mine):

"Section 10248 is added to the Government Code, to read:

"10248. (a) The Legislative Counsel [who operates the Legislative Data Center] shall, with the advice of the Assembly Committee on Rules and the Senate Committee on Rules, make all of the following information available to the public in electronic form:

"(1) The legislative calendar, the schedule of legislative committee hearings, a list of matters pending on the floors of both houses of the Legislature, and a list of the committees of the Legislature and their members.

"(2) The text of each bill introduced in each current legislative session, including each amended, enrolled [passed by the Legislature] and chaptered [signed or passed into law] form of each bill.

AB1624 will permit access to legislative details in time to participate in the process of our governance—not just gripe about the results, after the fact.

"(3) The bill history of each bill introduced and amended in each current legislative session [a session is two years; some bills are completed in one year, like AB1624; others are "two-year bills"].

"(4) The bill status of each bill introduced and amended in each current legislative session [about five thousand bills are introduced in a two-year legislative session].

"(5) All bill analyses prepared by legislative committees in connection with each bill in each current legislative session. [Partisan analyses by party caucuses are sometimes more important, but are apparently *not* included.]

"(6) All vote information concerning each bill in each current legislative session.

"(7) Any veto message concerning a bill in each current legislative session [if a Governor vetoes a bill, he or she usually explains why].

"(8) The California Codes [the state's laws or statutes; previously sold on magtape for over $200,000 per copy].

"(9) The California Constitution [which includes enacted ballot initiatives].

"(10) All statutes enacted on or after January 1, 1993 [this is essentially redundant with (8), but assures continuing updates of the codes].

"(b) The information identified in subdivision (a) shall be made available to the public by means of access by way of the largest nonproprietary, nonprofit cooperative public computer network [i.e., via the Internet, which in turn is gatewayed to Fidonet, Delphi, GEnie, America Online, CompuServe, etc.].

"The information shall be made available in one or more formats and by one or more means in order to provide the greatest feasible access to the general public in this state.

"Any person who accesses the information may access all or any part of the information.

"The information may also be made available by any other means of access that would facilitate public access to the information [appears to *clearly* authorize independent BBS and computer-host operators to systematically copy all information, continuously update their files, and offer access and value-added options, limited only by the imagination!].

"The information that is maintained in the legislative information system that is operated and maintained by the Legislative Counsel shall be made available in the shortest feasible time after the information is available in the information system [the Legislature's $25-million internal system used by staff throughout the Capitol and in legislators' district offices].

"The information that is not maintained in the information system shall be made available in the shortest feasible time after it is available to the Legislative Counsel. [Delays in data becoming "available" on the internal system has been a problem in the past; activists will monitor it.]

"(c) Any documentation that describes the electronic digital formats of the information identified in subdivision (a) and is available to the public shall be made available by means of access by way of the computer network specified in subdivision (b).

"(d) Personal information concerning a person who accesses the information may be maintained only for the purpose of providing service to that person.

"(e) **No fee or other charge may be imposed by the Legislative Counsel as a condition of accessing the information** that is accessible by way of the computer network specified in subdivision (b) [boldface added].

"(f) The electronic public access provided by way of the computer network specified in subdivision (b) shall be in addition to other electronic or print distribution of the information [to state the obvious].

"(g) No action taken pursuant to this section shall be deemed to alter or relinquish any copyright or other proprietary interest or entitlement of the State of California relating to any of the information made available pursuant to this section." [Some Sacramento powerhogs actually propose that records about legislation-in-process might be public, but are nonetheless exclusive property of the Legislature!]

SPREAD THE WORD

And send yer comments to me at 345 Swett Road, Woodside, CA 94062 or email to jwarren@well.sf.ca.us. ■

Warren founded InfoWorld, *Wireless Digital, Initiative, Inc., and one of the nation's largest public microcomputer conventions. He was founding host of PBS's* Computer Chronicles, *founding editor of* Dr. Dobb's Journal, *and has chaired various trade and professionals' organizations. He holds graduate degrees in computing (Stanford), medical information science (UC Medical Center), and mathematics & statistics. He has been a computer professional since 1968, and was a mathematics teacher and professor for ten years before that.*

He organized and chaired the landmark First Conference on Computers, Freedom & Privacy (1991), was one of the first to receive the Electronic Frontier Foundation Pioneer Award (1992), and led the recent successful effort to make state legislation available via the public nets without state charge. He is a member of the board of directors of Autodesk, Inc.

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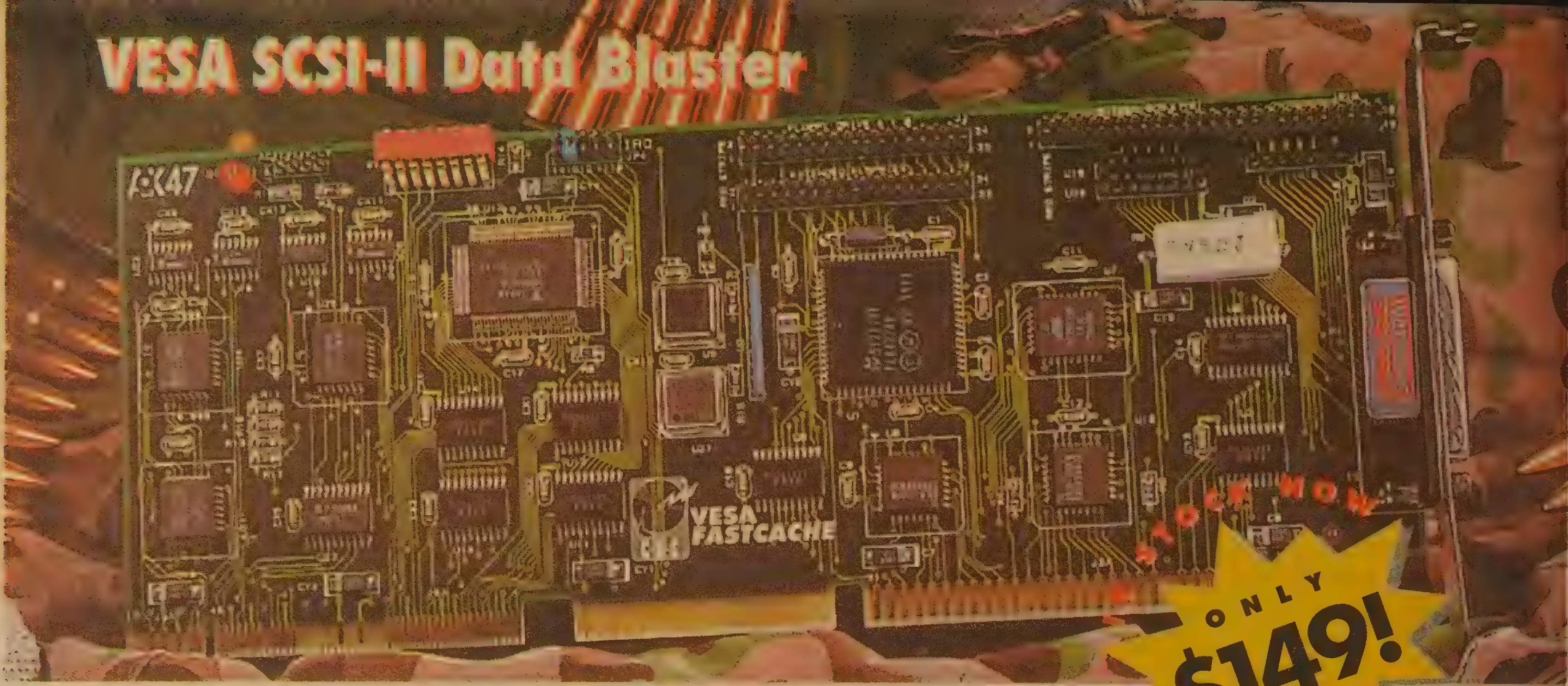

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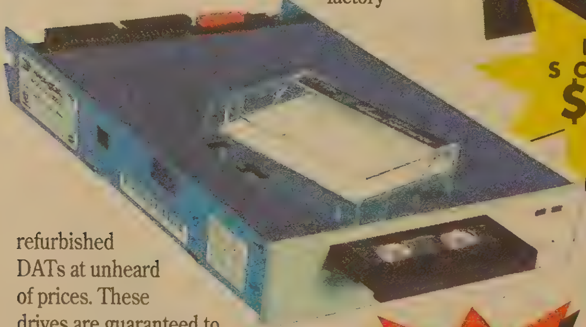

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A Plain Text On Crypto Policy

BY JOHN PERRY BARLOW

The field of cryptography, for centuries accustomed to hermetic isolation within a culture as obscure as its own puzzles, is going public. People who thought algorithms were maybe something you needed to dig rap music are suddenly taking an active interest in the black arts of crypto.

We have the FBI and NSA to thank for this. The FBI was first to arouse public concerns about the future of digital privacy with its injection of language the year before last into a major Senate anti-crime bill (SB 266) which would have registered the congressional intent that all providers of digitized communications should provide law enforcement with analog access to voice and data transmissions of their subscribers.

When this was quietly yanked in committee, they returned with a proposed bill called Digital Telephony. If passed, it would have essentially called a halt to most American progress in telecommunications until they could be assured of their continued ability to wiretap. Strange but true.

They were never able to find anyone in Congress technologically backward enough to introduce this oddity for them, but they did elevate public awareness of the issues considerably.

The National Security Agency, for all its (unknown but huge) budget, staff, and MIPS, has about as much real world political experience as the Order of Trappists and has demonstrated in its management of cryptology export policies the maddening counter-productivity that is the usual companion of inexperience.

The joint bunglings of these two agencies were starting to infuriate a lot of people and institutions who are rarely troubled by Large Governmental Foolishness in the Service of Paranoia. Along with all the usual paranoids, of course.

Then from the NSA's caverns in Fort Meade, Maryland, there slouched a chip called Clipper.

For those of you who just tuned in (or who tuned out early), the Clipper Chip—now called Skipjack owing to a trademark conflict—is a hardware encryption device that NSA designed under Reagan-Bush. In April it was unveiled by the Clinton Administration and proposed for both governmental and public use. Installed in phones or other telecommunications tools, it would turn any conversation into gibberish for all but the speaker and his intended listener, using a secret military algorithm.

Clipper/Skipjack is unique, and controversial, in that it also allows the agents of government to listen under certain circumstances. Each chip contains a key that is split into two parts immediately following manufacture. Each half is then placed in the custody of some trusted institution or "escrow agent."

If, at some subsequent time, some government agency desires to legally listen in on the owner of the communications device in which the chip has been placed, it would present evidence of "lawful authority" to the escrow holders. They will reveal the key pairs, the agency will join them, and begin listening to the subject's unencrypted conversations.

(Apparently there are other agencies besides law enforcement who can legally listen to electronic communications. The government has evaded questions about exactly who will have access to these keys, or for that matter, what, besides a judicial warrant, constitutes the "lawful authority" to which they continually refer.)

Clipper/Skipjack was not well received. The blizzard of anguished ASCII it summoned forth on the Net has been so endlessly voluble and so painstaking in its "How-many-Cray-Years-can-dance-on-the-head-of-a-Clipper-Chip" technical detail that I would guess all but the real cypherpunks are by now data-shocked into listlessness and confusion.

Indeed, I suspect that even many readers of this publication are starting to long for the days when their knowledge of cryptography and the public policies surrounding it was limited enough to be coherent.

So I almost hesitate to bring the subject up. Yet somewhere amid this racket, decisions are being made that will profoundly affect your future ability to communicate without fear. Those who would sacrifice your liberty for their illusions of public safety are being afforded some refuge by the very din of opposition.

In the hope of restoring both light and heat to the debate, I'm going to summarize previous episodes, state a few conclusions I've drawn about the current techno-political terrain, and recommend positions you might consider taking, as well as actions that might support them.

CLIPPER/SKIPJACK REALLY IS A DUMB IDEA

When I first heard about Clipper/Skipjack, I thought it might not be such a bad idea. This false conclusion was partly due to the reality distorting character of the location...I was about 50 feet away from the Oval Office at the time—but it also seemed like one plausible approach to what may be the bright future of crime in the Virtual Age.

I mean, I can see what the Guardian Class is worried about. The greater part of business is already being transacted in Cyberspace. Most of the money is there. At the moment, however, most of the monetary bits in there are being accounted for. Accounting is digital, but cash is not.

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It is imaginable that, with the widespread use of digital cash and encrypted monetary exchange on the Global Net, economies the size of America's could appear as nothing but oceans of alphabet soup. Money laundering would no longer be necessary. The payment of taxes might become more or less voluntary. A lot of weird things would happen after that...

> ***It is increasingly hard for me to imagine any other purpose for the Clipper/Skipjack operetta if not to prepare the way for the restriction of all private cryptographic uses to a key escrow system.***

I'm pretty comfortable with chaos, but this is not a future I greet without reservation.

So, while I'm not entirely persuaded that we need to give up our future privacy to protect ourselves from drug dealers, terrorists, child molesters, and unnamed military opponents (the Four Horsemen of Fear customarily invoked by our protectors), I can imagine bogeymen whose traffic I'd want visible to authority.

Trouble is, the more one learns about Clipper/Skipjack, the less persuaded he is that it would do much to bring many actual Bad Guys under scrutiny.

As proposed, it would be a voluntary standard, spread mainly by the market forces that would arise after the government bought a few tons of these chips for their own "sensitive but unclassified" communications systems. No one would be driven to use it by anything but convenience. In fact, no one with any brains would use it if he were trying to get away with anything.

In fact, the man who claims to have designed Clipper's basic specs, Acting NIST Director Ray Kammer, recently said, "It's obvious that anyone who uses Clipper for the conduct of organized crime is dumb." No kidding. At least so long as it's voluntary.

Under sober review, there mounted an incredibly long list of reasons to think Clipper/Skipjack might not be a fully baked idea. In May, after a month of study, the Digital Privacy and Security Working Group, a coalition of some forty companies and organizations chaired by the Electronic Frontier Foundation (EFF), sent the White House 118 extremely tough questions regarding Clipper, any five of which should have been sufficient to put the kibosh on it.

The members of this group were not a bunch of hysterics. It includes DEC, Hewlett-Packard, IBM, Sun, MCI, Microsoft, Apple, and AT&T (which was also, interestingly enough, the first company to commit to putting Clipper/Skipjack in its own products).

Among the more troubling of their questions:

- Who would the escrow agents be?
- What are Clipper's likely economic impacts, especially in regard to export of American digital products?
- Why is its encryption algorithm secret and why should the public have confidence in a government-derived algorithm that can't be privately tested?
- Why is Clipper/Skipjack being ram-rodded into adoption as a government standard before completion of an overall review of US policies on cryptography?
- Why are the NSA, FBI, and NIST stonewalling Freedom of Information inquiries about Clipper/Skipjack? (In fact, NSA's response has been, essentially, "So? Sue us.")
- Assuming Clipper/Skipjack becomes a standard, what happens if the escrow depositories are compromised?
- Wouldn't these depositories also become targets of opportunity for any criminal or terrorist organization that wanted to disrupt US law enforcement?
- Since the chip transmits its serial number at the beginning of each connection, why wouldn't it render its owner's activities highly visible through traffic analysis (for which government needs no warrant)?
- Why would a foreign customer buy a device that exposed his conversations to examination by the government of the United States?
- Does the deployment and use of the chip possibly violate the 1st, 4th, and 5th Amendments to the US Constitution?
- In its discussions of Clipper/Skipjack, the government often uses the phrase "lawfully authorized electronic surveillance." What, exactly, does it mean by this?
- Is it appropriate to insert classified technology into either the public communications network or into the general suite of public technology standards?

And so on and so forth. As I say, it was a very long list. On July 29, John D. Podesta, assistant to the President and White House staff secretary (and, interestingly enough, a former legal consultant to EFF and co-chair of the Digital Privacy Working Group), responded to these questions. He actually answered few of them.

Still unnamed, undescribed, and increasingly unimaginable were the escrow agents. Questions about the inviolability of the depositories were met with something like, "Don't worry, they'll be secure. Trust us."

There seemed a lot of that in Podesta's responses. While the government had convened a panel of learned cryptologists to examine the classified Skipjack algorithm, it had failed to inspire much confidence among the crypto establishment, most of whom were still disinclined to trust anything they couldn't whack at themselves. At the least, most people felt a proper examination would take longer than the month or so the panel got. After all, it took fifteen years to find a hairline fissure in DES.

Neither Podesta nor any other official explained why it had seemed necessary to use a classified military algorithm for civilian purposes. Nor were the potential economic impacts addressed. Nor were the concerns about traffic analysis laid to rest.

But as Thomas Pynchon once wrote, "If they can get you asking the wrong questions, they don't have to worry about the answers." Neither asked nor answered in all of this was the one question that kept coming back to me: Was this trip really necessary?

For all the debate over the details, few on either side seemed to be approaching the matter from first principles. Were the enshrined threats...drug dealers, terrorists, child molesters, and foreign enemies...sufficiently and presently imperiling to justify fundamentally compromising all future transmitted privacy?

I mean—speaking personally now—it seems to me that America's greatest health risks derive from the drugs that are legal, a position the statistics overwhelmingly support. And then there's terrorism, to which we lost a total of two Americans in 1992; even with the World Trade Center bombing, only six in 1993. I honestly can't imagine an

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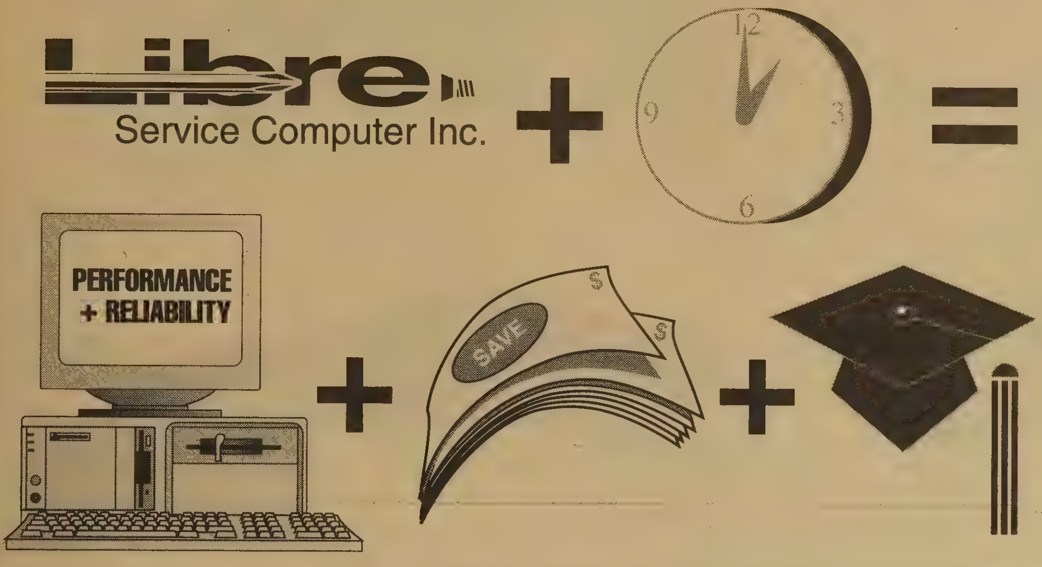

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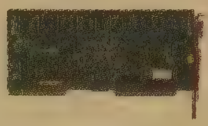

The Cardex W32 —Recommended Buy, PC World, Oct. 1993

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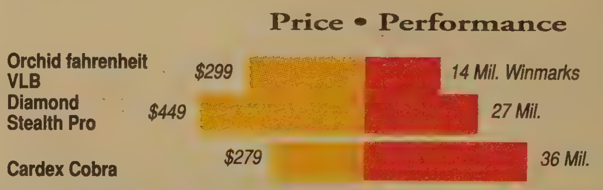
—PC Magazine, July 1993 in "Perfect Display" section



ZD Winbench 3.11 Test, Oct. 1993; Resolution 1024 x 768 x 256 colors. Test performed with Micronics JX-30VL motherboard, 4MB memory, Intel 486DX2-66 CPU and standard Non-interlaced VGA monitor; suggested retail prices for 2MB memory

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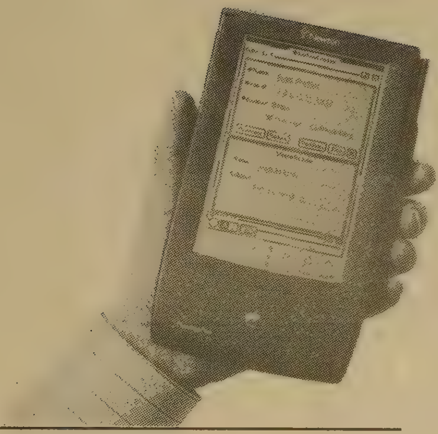

Hands On: The Apple Newton

The Truth Lies Between The Extremes

BY MITSU HADEISHI

Now widely available, the basic Apple Newton MessagePad PDA (Personal Digital Assistant) is selling for about $799, or, bundled with a Macintosh Connection Kit and 9600bps fax/2400bps data modem, for around $1000. (The Sharp ExpertPad, essentially the same machine as the basic MessagePad, is going for about $699.) Measuring 4 1/4" x 7 1/4" x 7/8", the unit is even larger than a Sharp Wizard OZ-8000 or a Casio SF-R20, which makes it too large to fit into a pants pocket, but neverthless small enough for a jacket pocket.

Many have criticized the MessagePad as too expensive, not good enough at handwriting recognition, not equipped with enough memory, and not shipped with enough built-in applications. Others have hailed it as a technological breakthrough, tremendous power in a small and remarkably inexpensive package, and the first real consumer-level product in a new, soon-to-be multi-billion-dollar industry. Where does the truth reside?

As usual, somewhere in the middle.

PENS AND PALMTOPS

NEWTON HANDWRITING

As I mentioned in last month's column, the Newton handwriting recognition engine works in a special way: it recognizes entire words, rather than single letters. This makes for much better recognition capability than what's in the pen-based operating systems such as GO Corporation's PenPoint or Microsoft's Windows for Pens.

However, when I first turned on the unit, it could accurately recognize less than half of the words I wrote. Many times its attempts at interpretation were rather perplexing ("The electricity is buzzing in my ear" became "The electricity is berries I'd 44 LA." Note that it got the word "electricity"—it tends to do better with longer words, as I'll explain below). As I worked with the machine, however, it slowly improved in its recognition rate; after several hours, it was recognizing at around 90% or so. I've heard reports of experienced users getting recognition rates of at least 95%. That is relatively good, since you can quickly correct errors by double-tapping on the word misrecognized, and it often lists the word you're looking for as an alternate choice. This became less of an issue as time went on: I slowly became more proficient at learning how to write so the machine would interpret it more accurately, and the machine became better at understanding my own handwriting.

Interestingly, the Newton is better at recognizing cursive handwriting than printed characters—exactly the opposite of other handwriting recognizers, which usually do not work at all with cursive writing. It also tends to work better if you write each word continuously, without stopping; some people, when first using the Newton, attempt to write very slowly, one letter at a time, and then complain that the unit does not recognize their handwriting. If you pause long enough, the Newton assumes you're starting a new word. On the other hand, if you don't space your words out enough, the recognizer can run two words together and try to interpret them as one word ("Eat lunch" was interpreted as "entrance," for example, when I wrote the words too close together).

The upshot is that the Newton is generally better at recognizing handwriting the other units have difficulty with (or cannot handle at all), but it does require some care to get reasonable recognition rates.

It is also interesting that it does much better on longer, more complex words than on shorter, common words. The longer words are generally more unambiguous; fewer other words could be potential matches. Shorter, more common words are more difficult for it to interpret, because there are many words the Newton could mistake for the word you're intending to write. Again, this is different from most letter-based recognizers, which are more likely to misread a long word than a short one, just because there are more letters, and therefore more chances that one of them will be misinterpreted.

Of course, if the word you are trying to use doesn't happen to be in the Newton's vocabulary, it won't have a clue. (Curiously, even though the unit is supposed to be primarily an address book/day-timer replacement, it does not recognize ordinal numbers, as in "23rd of December" or "15th of this month.") However, you can add words to the Newton's vocabulary, either by correcting it when it misinterprets your writing, or by typing the unknown words directly into the user dictionary. I added the ordinal numbers from 1st–31st, after which it had no problem recognizing them quite easily.

PENS: NOT A PANACEA

Even if the unit had 100% recognition accuracy, however, it would not be nearly as fast as a keyboard for entering data. The designers of the Newton have explicitly said that they envision the unit as being primarily used for data retrieval rather than data entry. For example, they imagine you'll be spending a lot more time using it to look up names in an address book than entering memos or writing letters and notes.

Personally, I use my Casio SF-R20 for both purposes; as an address book (primarily data retrieval) and as a memo pad/sophisticated calculator (primarily data entry). The built-in spreadsheet is a lot more powerful than any calculator, and it is portable—fits right in my pocket—so I can use it to do simple financial analyses or other computations anywhere, anytime. Or I can quickly jot down people's addresses

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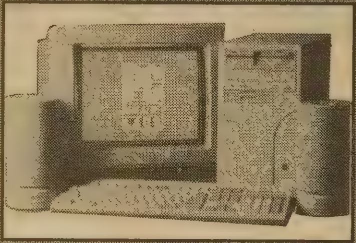

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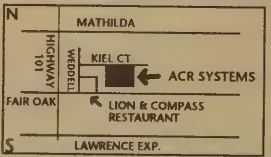

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and phone numbers as they give them to me. This is not as easy to do, strangely enough, with the Newton.

We did an unscientific test with a few different people entering data into both the Newton and the Casio SF-R20 at the same time. First, I tried entering a simple sixteen-word sentence into both the Newton and the SF-R20. After having a few hours' training, Newton was able to recognize most of the words, but the time it took to correct the errors and edit it brought the total time to enter the sentence to around seventy seconds.

By contrast, typing into my Casio (something I am very adept at from long practice, admittedly), it took thirteen seconds, even on the tiny little organizer keyboard (it took me seven seconds to enter it on a full-sized computer keyboard). This test, of course, is extreme, since I am very accustomed to using the Casio keyboard. So we repeated these tests with people who are proficient full-sized keyboard typists but have not used a small organizer keyboard more than a few times before. They took about 25-30 seconds to type the same sentence into the Casio. We also tried to see how fast we could simply hand-write the same sentence, ignoring errors—it took around twenty-five seconds, and of course the recognition was terrible.

The conclusion we reached is this: even a 100%-accurate handwriting recognizer would be no faster than a good typist entering information, even on a tiny organizer keyboard—and, with a little practice, typing could be twice as fast as the handwriting method of entry. However, factoring in correction of errors, and the handwriting recognizer drops to two to five times slower than typing, even on a tiny organizer keyboard (for a proficient typist).

The only users for whom handwriting might be a faster way to enter data would be those people who do not know how to use a keyboard well. Thus, the Newton could be said to really be the "computer for the rest of us"—where "us" refers to those folks who have not yet even learned to type, but would rather use handwriting as their preferred input medium.

Of course, pen input provides other benefits that you do not get from a keyboard. In particular, the display can be larger, since the input device *is* the display. One can easily enter drawings and other graphical information. Handwriting is natural—you just pick it up and start jotting down notes. We're used to doing that already. I would, however, personally prefer a combination of both.

The Newton is therefore usable for a certain restricted class of applications. You do not want to use it to enter large or even medium amounts of textual information. Very brief notations, and so forth, are really its limit. You don't want to write letters with it, or try to do extensive computations—the numeric recognizer often misreads numbers, and it isn't always easy to notice that it is doing so. However, if your use is primarily as an information retrieval device, where you're reading email (but not responding at length), reading memos, looking up addresses, or perhaps using the machine with an plug-in PCMCIA 2.0 card for the purpose of accessing a database or library, then the Newton could well have a niche of usability.

Newtonian Applications

Built-in applications for the Newton are extremely basic. You have a notepad, an address book, a calendar, and a calculator capable of doing simple financial computations and units conversion. In addition to these applications, the Newton has built-in support for fax modems, data modems, and a built-in infrared communications port which it can use to transfer information to other Newtons. The notepad can be used for both text and graphics.

Off the shelf, the Newton doesn't offer significantly more functionality than some of the low-end organizers that have been on the market for some time. In addition, data entry is even slower than these organizers, as noted above. The rather small suite of built-in applications limits its real utility out of the box. The card slot allows you to add functionality, although there is only one slot, so you couldn't, for example, add both memory expansion and an application card at the same time.

How well does it do as an organizer? Well, after training it, I definitely found it usable, though I wouldn't trade in my SF-R20 for it at the moment (even if the Newton didn't cost two to three times what a high-end Wizard or Casio does, or four to ten times more than a more inexpensive

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organizer). The calendar is functional, though basic; for example, unlike the Sharp Wizard or Casio B.O.S.S. organizers, it doesn't display which days you have an appointment or an alarm. You can easily search for appointments by name, and it does have a handy find facility, though it isn't very much more powerful than similar facilities in high-end Sharp or Casio organizers.

The address-book situation is similar. Entering names and addresses can be a particularly laborious task, for reasons stated above; in addition, most proper names are not in the dictionary, so you have to enter them letter by letter in many cases (usually by tapping the names out on a little pop-up display of a keyboard). Though finding addresses and names is quite straightforward and relatively quick, again the functionality is not much better than a pocket organizer which can be had for much less money.

The unit is most usable as an address book and calendar. The memo pad function is not very good for large or medium amounts of text because of the slowness of data entry (made worse by having to correct the occasional errors). One feels a sense of accomplishment just entering one correct sentence!

Graphics are easy to put into this machine, however, so for jotting down quick maps, diagrams, and so forth the Newton is quite capable. The user interface is uniform and intuitive, which does make it a lot better for novices than another pen-based organizer, the Sharp OZ-9600, which has a very complicated and awkward UI.

So, if you need graphics input, are not intending to input a lot of text into the machine, and are planning to use it primarily as an information-access device, then the Newton could be useful for you. It might also serve you well if you simply don't want to use a small organizer keyboard and need a well-designed, uniform, and generally powerful user interface.

Sharp ExpertPad

The Sharp ExpertPad is identical to the basic Newton, but it comes with a cover which protects the display, and it is also selling for a slightly lower price.

However, the Macintosh Connection Kit, used to connect the Newton to an Apple Macintosh computer and to transfer information back and forth, is available only from Apple (it is also available from Apple as a special bundle with the Newton called the MessagePad Professional Communications System, including the Macintosh Connection Kit and a 9624 fax modem). ■

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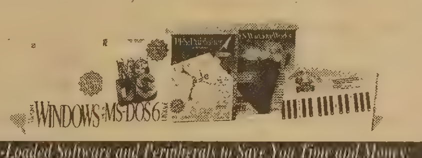

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Reopening Windows, Quickly

A Quick Restart Option For Portable Users

BY ED KAHN

RESOURCES:

Quick Restart, $79.95
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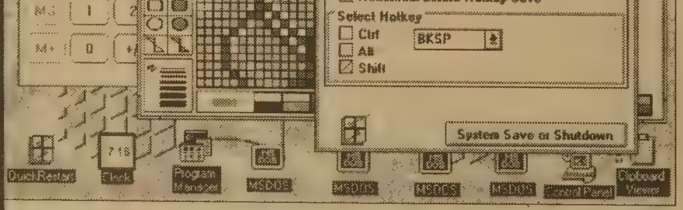
PO Box 4611
Foster City, CA 94404
(415)345-9278

Quick restart is one of the newer features for portable computers that has been introduced by several manufacturers over the past few years. When you power up, this feature returns you to where you left off, it doesn't matter if you were in the middle of a document or several applications. It also means that you can turn the computer off in the middle of a task without losing data or your place. When we were running everything under MS-DOS, this capability was convenient, but not that much of a time saver. Now that Windows are increasingly appearing at a computer near you, to be able to power down in the middle of a job offers significant advantages.

The first benefit is that notebook users can enjoy power conversation for their batteries. Secondly, time is saved. It frequently takes minutes, not seconds, to load a computer with the applications listed in the startup window of Windows. And finally, for computer users on the go, it is especially convenient to be able to do a quick exit without having to save the file you are working on and then reload it and find your place in the next work session.

LAPTOPS



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☒ Enable Beep / Audible Alerts
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Hotkey Options
☒ Enable Hotkey for System Save
☐ Halt System After Hotkey
☐ Reconfirm before Hotkey Save

Select Hotkey
☐ Ctrl
☐ Alt
☒ Shift
BKSP

As convenient as quick restarting is, I have never considered it so important that I would buy a portable simply because it included this feature. But with all else being equal, it is certainly a nice addition. However, now you can have this feature whether it comes with your computer or not.

PowerPro Software Quick Restart gives you the capability to add this feature to practically any computer. While there are several competing products, I chose this one because it is comparatively less expensive and works in both Windows and DOS environments.

Once Quick Restart is installed, all you need to do is hit a hot key—shift/backspace is the default—and then wait for the beep before shutting down. The software writes an image file containing everything that was loaded into the system that will be reloaded the next time you power up. Copying to the image file took about ten seconds, which is a lot quicker than saving a document, getting back to the Program Manager, and exiting Windows. When you return, the system automatically reloads all of the files just as they were when you shut down. This took about thirty-five seconds from the time I powered on, compared to the nearly two minutes it generally takes to load my system with the applications I have in the startup window.

After my initial doubts, I have been very delighted by the performance of Quick Restart. I first tried it on my desktop machine, which has a fairly complex configuration. It was easy to install by following the choices that appeared on the screen. When I rebooted, however, I noticed that certain titles were missing from my screen. Because one of the options that did appear was uninstall, I was not worried. I am pleased to report that this choice does a complete job. All traces of the program were removed and my system returned to its original state. I knew that technical support would be able to sort this out for me, but I was impatient to see if it would work with a portable system—that was the test I really cared about.

Installation on my notebook was going along smoothly until there appeared to be a problem finding space to write the image file. It turned out that the problem was not with this program, but rather a combination of problems made worse by MS-DOS 6's DoubleSpace. (Unfortunately, I had installed this feature some months ago and have not yet taken the time to remove it.) Quick Restart directed me to make more room in the noncompressed partition of the hard drive where some of the essential startup files live.

This proved to be quite a task—DOS told me that my disk was fragmented and that I should run Defrag.exe, the defragmenting utility included with DOS 6.0. But even after that, I kept getting the error message that said my disk was too fragmented. With help from the people at PowerPro, I discovered that the problem was caused by a hidden file at the very end of the hard drive partition.

Once this obstacle was removed, the Quick Restart installed easily and does everything it claims. When it asked for information about my video display system, I feared that it would not work since I use a color monitor at home and the built-in LCD display when traveling. Quick Restart doesn't care because both displays are VGA.

Quick Restart is complex in its construction, but simple in its interface. If you have longed for a quick restart feature, this program is worth getting. If you have trouble installing it, you can be assured that not only can you safely back out but also that you can get helpful technical support from PowerPro.

continued on page 258

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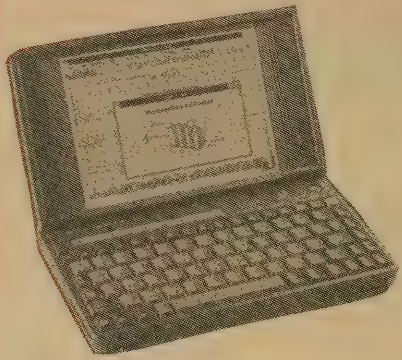

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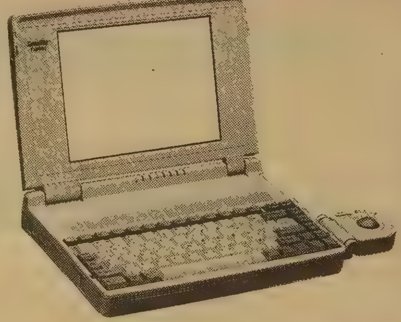

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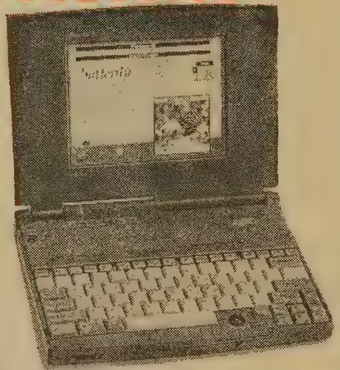

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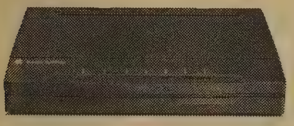

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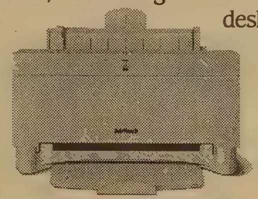

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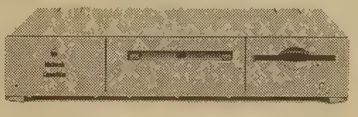

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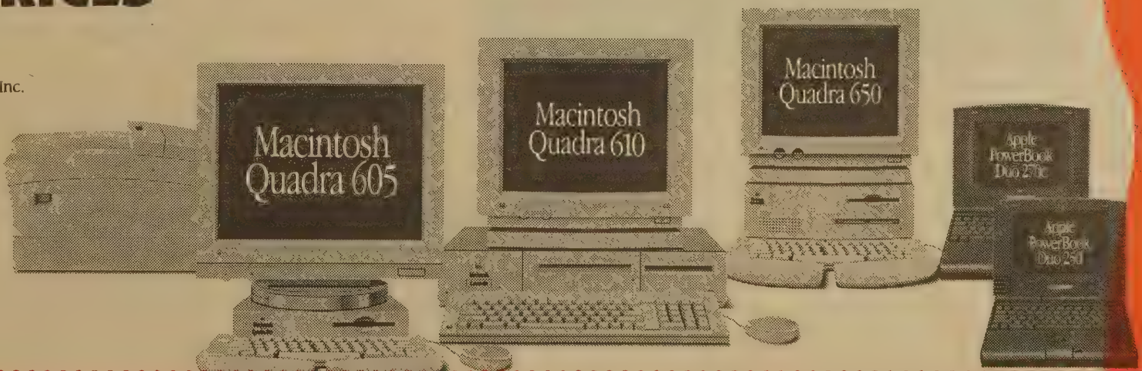

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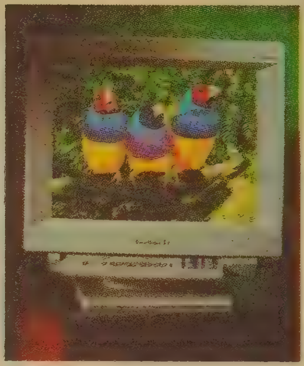

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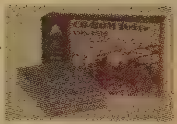

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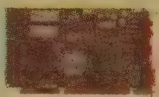

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Telework Center's Grand Opening

Neighborhood TeleWork Centers Begin To Appear On The Map

BY ROBERT MOSKOWITZ

NEW TELEWORK CENTER IN CORONADO

The nation's first active neighborhood telework center opened in Coronado, California, just across the bay from San Diego, on October 8, 1993. As you know if you've been reading this column, CalTrans is funding and UC Davis is overseeing the start-up and management of a series of such neighborhood centers. It's part of a study to see if commuters can be coaxed from their cars to work within walking, bicycling, or bussing distance of their homes.

"We're confident the employees working here will demonstrate the value of the Neighborhood TeleCentre," says Kevin Ham, executive director of the Coronado Transportation Management Association, which is helping to sponsor and manage the new facility. "This is a viable alternative to the single occupant vehicle commute."

The Coronado Neighborhood TeleCentre boasts four beautifully designed and appointed telecommuting workstations outfitted with computers, access to a modem and a printer, plus a fax, copier, conference room, and lunch room. All furniture and fittings meet OSHA (safety) and ADA (disability) guidelines. The entire layout is ergonomically designed for comfort, convenience, and efficiency. For example, natural northern light is supplemented by "task" lighting from state-of-the-art nonglare lamps. Computer monitors are mounted on movable arms for easy adjustment to eliminate eye or neck strain. Computer keyboard trays were custom-designed for user comfort.

Located in a building that has just been totally renovated, the TeleCentre was designed and built from the ground up specifically to support telecommuters. In addition, the new Neighborhood TeleCentre is centrally located in Coronado's "downtown," near enough to local shops and services that telecommuters won't feel they must drive somewhere else to find lunch, get a haircut, or do some incidental shopping during lunch or after work. This is important, because the major thrust of the CalTrans/UC Davis program is not just to reduce congestion during rush hours, but to reduce the total number of times people use their cars.

From this perspective, driving to a telework center, or driving from the telework center to shopping, is nearly as bad as driving downtown to go to work. Thus, the Coronado Neighborhood TeleCentre was deliberately sited within a community full of potential telecommuters, and even within that community was carefully positioned in a popular shopping area along major bus and bicycle routes. It's even possible to use Coronado's 27-passenger electric shuttle to travel to the TeleCentre without causing the expenditure of any measurable air pollution at all.

As you probably recognize, most telecommuting work centers are set up with twenty to thirty workstations, and are intended to draw from a fairly large geographical area, perhaps with a radius as large as 5 to 10 miles. In contrast, CalTrans' neighborhood telecommuting centers are not expected to draw people from more than 1 mile in any direction. Thus, to serve an entire community there will need to be as many of these small neighborhood centers as there now are video stores, grocery stores, or copy centers.

TELECENTRE AGREEMENT

Use of the Coronado Neighborhood TeleCentre is currently subsidized by the CalTrans project and by CTMA so that it is

basically free, provided that employers of telecommuters working there sign an agreement covering the responsibilities of all parties.

In part, the agreement reads:

Tenants (telecommuters) must work at the TeleCentre at least one day a week (because the facility is still in the demonstration phase of its useful life), and must provide a schedule for when they will be using the facility.

Tenants must participate in various surveys, focus groups, and other inquiries conducted as part of the evaluation of the CalTrans program.

Tenants are allowed to use only one workstation at a time, and must respect the privacy of other telecommuters during business hours of 9 am to 5 pm. After-hours access is available, but only by special arrangement.

Tenants will be charged monthly for their telephone usage, including local and long-distance calls, plus all incoming and outgoing faxes. Copies are charged at $0.04 each.

Tenants are expected to use the computer and other office equipment provided by the TeleCentre without modification or removal, except that each Tenant may provide his or her own computer softwar other office items (such as letterhead paper and paper clips) as needed.

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There are also various legal aspects to the memorandum of understanding, such as the Tenant's agreement: not to violate any laws while on the premises; not to hold the TeleCentre or any other entity responsible for any theft, accident, injury, or death that may occur there; and to maintain a million dollars in general liability insurance.

Clearly, this is a new and different concept. Within the next year, we should have clear evidence of how well it might work. As usual, you'll read about all these and other future developments right here. Kevin Ham, of the Coronado Transportation Management Association, invites any potential telecommuters or telecommuter employers in the San Diego area to come in and examine the possibilities.

OTHER CALTRANS CENTERS

Actually, the second CalTrans neighborhood telecommuting center open for business is in Roseville (Placer County), and communities for another four have been chosen. These centers will be sited in Grass Valley (Nevada County), Auburn (Placer County), Citrus Heights (Sacramento County), and a town in Eldorado County.

Project managers are also looking at areas in Vacaville (Solano County), Modesto (Stanislaus County), and some communities near San Diego (San Diego County), but no firm decisions have been made.

In the next phase of development, CalTrans researchers will survey community residents, seeking to identify likely telecommuters and to open negotiations with them and their employers about participation in the project. As in Coronado, local agencies actually manage the telecommuting center.

COMMUNITY LAWS COULD BETTER SUPPORT TELECOMMUTING

With the number of active telecommuters now estimated at some 7.6 million, more and more attention is turning to institutionalizing this mode of work. One of the difficulties is that municipal statutes tend to forbid people from working at home.

An article in the *Chicago Tribune* (September 7, 1993) found that Chicago zoning and business laws were

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All information must be completed to process your registration. Please print.

Name ______________________ Title ______________________
Company ____
Address ____
City ________________ State ________ Zip ____________
Phone (_____)________________ Fax (_____)________________

1. Title/job function (select only one):
Corporate Management/Administrative
11 ( ) **Corporate Management:** CEO, President, Owner, Director, Vice President, Partner, General Manager
12 ( ) **Financial:** CFO, Treasurer, Controller, Accountant, Financial Analyst, CPA
13 ( ) **Administrative:** Office Services, Secretary, Clerk, Word Processing Specialist, Librarian, Personnel Services
14 ( ) **Sales/Service/Marketing:** Sales Manager/Representative, Account Representative, Advertising/PR, Customer Service, Training
15 ( ) **Purchasing:** Agent, Buyer, Procurement Officer

Computer Systems/Operations Management/Staff
20 ( ) Computer Systems/Operations Management
22 ( ) Computer Systems/Operations Staff

Technical Management/Staff
30 ( ) Technical Management
31 ( ) Technical Staff
41 ( ) **Research**
50 ( ) **Consultant/Professional**
51 ( ) **Education**
52 ( ) **Other (specify)** ______________

2. Is your organization primarily (select only one):
Computer Products and Services for Sale
29 ( ) Consultant
24 ( ) Dealer, Distributor, Retailer
25 ( ) Hardware Manufacturer
26 ( ) Software Developer
27 ( ) Value-Added Reseller
30 ( ) Other Computer Services

Non-Computer Related Services
32 ( ) Agriculture/ Construction
41 ( ) Education & Training
33 ( ) Energy, Mining, Oil
34 ( ) Engineering/Architecture
39 ( ) Finance, Banking, Insurance
36 ( ) Government- Local, State
37 ( ) Government- Non-Military
38 ( ) Government- Military
44 ( ) Leisure
31 ( ) Manufacturing (other)
45 ( ) Media
43 ( ) Research & Development
47 ( ) Travel, Transportation
42 ( ) Trade (Wholesale, Retail)
35 ( ) Utilities (Gas, Electric, etc.)
48 ( ) Healthcare
46 ( ) Other

3. Please indicate which operating systems are currently in use at your locations:
40 ( ) OpenVMS/VAX
41 ( ) OpenVMS/AXP
42 ( ) UNIX
43 ( ) ULTRIX
44 ( ) MS-DOS
45 ( ) OS/2
46 ( ) HP-UX
47 ( ) SUN/OS/SOLARIS
48 ( ) Windows NT
49 ( ) UNIX/XENIX
50 ( ) SCO
51 ( ) A/UX
52 ( ) Other
53 ( ) VM
54 ( ) OS/400
55 ( ) MVS

4. Total employees in entire company/institution/government department (select only one):
2 ( ) 10,000 or more
3 ( ) 5,000 to 9,999
4 ( ) 1,000 to 4,999
5 ( ) 500 to 999
6 ( ) 250 to 499
7 ( ) 100 to 249
8 ( ) 6 to 99
9 ( ) Fewer than 6

5. Amount of all computer-related expenditures to be made by my organization annually (or by my client's organization if I am a reseller or consultant):
70 ( ) Over $5,000,000
71 ( ) $1,000,001-$5,000,000
72 ( ) $500,001-$1,000,000
73 ( ) $100,001-$500,000
74 ( ) $50,001-$100,000
75 ( ) $25,001-$50,000
76 ( ) Up to $25,000
77 ( ) None of the above

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> **"We're confident** the employees working here will demonstrate the value of the Neighborhood TeleCentre."
> *—Kevin Ham, Executive Director of the Coronado Transportation Management Association*

openly hostile to telecommuting, explicitly forbidding, for example, the use of "mechanical or electrical equipment" for business purposes in the home. Many other communities require people who want to work—even telework—from home to obtain a business license and submit to an annual inspection.

Decades and centuries ago, these restrictions served important functions by preventing industrial processes from destroying the quality of life in residential neighborhoods. (My Victorian home in the Germantown section of Philadelphia, for example, was subject to an explicit prohibition against operating a "bone boiling establishment" on the premises.)

But today, the technology required to do business at home—and particularly to telecommute from home—is a lot less intrusive, smelly, or obnoxious than those who originally wrote these municipal restrictions seem to have contemplated.

"There's a lot of worry about these zoning restrictions, restrictive covenants, and other limitations on the work you can do at home," says Jack Nilles, a longtime telecommuting consultant who for years has been following the concern over restrictions on telecommuting. "But they don't seem to impact the people who have jobs and simply do some of their work from home. I've simply never heard of them being enforced, just like they no longer enforce laws against horseless carriages that may still be on the books. In the Sacramento area, for example, zoning officials weren't even aware of any restrictions that zoning might place on telecommuting."

Jack believes the only real problem would occur if your neighbor was mad at you for some reason and happened to come across some kind of zoning law or condo association rule that he could use to get back at you.

The City of Los Angeles is one of many California cities with ordinances against home-based businesses. Los Angeles has been in the process of modifying its ordinances to allow people to do more business at home, provided their work does not adversely affect the residential neighborhood with frequent truck deliveries, odors or chemical spills, heavy employment, and so forth.

Jack's advice is simple: Don't worry about restrictions on telecommuting until you begin to hear that a number of cases have come up and have been decided against the telecommuter. Until then, use

Telecommuting: A Survey

This survey form, from the American Telecommuting Association and *MicroTimes*, is intended to collect details on the telecommuting experiences of a broad cross-section of individuals. Your cooperation in answering these questions will help to make the results of this survey more accurate and detailed. Thank you very much for your participation.

You may copy this form and pass it along to anyone you know who is presently telecommuting or interested in telecommuting.

Please fill in one copy of this form and fax it to: (818)224-4343 (24 hours), or mail it to Survey, P.O. Box 6375, Woodland Hills, CA 91365.

Name (Optional): ____________________
Business Phone (Optional): ____________________
Age: ______ **M/F?** ______
Job Title: ____________________
Employer Name: ____________________
Addr 1: ____________________
Addr 2: ____________________
City, State, Zip: ____________________

Your Employer's Attitude Toward Telecommuting: (*Circle One*)
1. Strongly Supportive 2. Supportive 3. Indifferent 4. Opposed 5. Strongly Opposed

# Miles You Travel From Your Home To Work: ____________________
# Days Per Week You Make This Commute: ____________________

Means Of Travel: (*Circle All That Apply*)
1. Carpool 2. Car 3. Bus 4. Train 5. Bicycle 6. Walk 7. Other

# Miles From Home To TeleWork Site (*"0" If You Work At Home*): ______
# Days Per Week You Telecommute: ____________________
# Years You Have Been Telecommuting: ____________________

Do You Telecommute As Part Of A Formal Telecommuting Program In Your Company, Or Have You Received Only Your Supervisor's Approval For Telecommuting? (*Circle One*)
1. Formal 2. Informal

How Many Others In Your Company Telecommute? ______________
How Many Other Employees In Your Company? (*Total*) ______________

Types Of Work You Do In Office: (*Circle All That Apply*)
1. Administrative 2. Clerical 3. Analytical 4. Creative 5. Managerial 6. Professional 7. Other

Types Of Work You Do While Telecommuting: (*Circle All That Apply*)
1. Administrative 2. Clerical 3. Analytical 4. Creative 5. Managerial 6. Prof'l 7. Other

Do You Need A Computer To Do Your Job?
1. Yes 2. No 3. Some (*Indicate %*) ______

Your Primary Personal Benefits Of Telecommuting: (*Circle All That Apply*)
1. Personal Freedom 2. Time With Family 3. Avoid Commute Time 4. Avoid Commute Cost 5. Avoid Office Culture/Interruptions 6. Other

Your Primary Complaints About Telecommuting: (*Circle All That Apply*)
1. Isolation From Office 2. Conflict With Home And Family 3. Lack Of Resources To Accomplish Work 4. Other

What Do You Need As A Telecommuter? (*Circle All That Apply*)
1. Custom Information 2. Reference Materials 3. Telecommuter Conferences 4. Current Events In Telecommuting 5. Training 6. New Telecommuting Technology 7. Contact With Other Telecommuters 8. Discount Phone Services 9. Discount Purchasing Of Office Supplies 10. Discount Shipping 11. A "Jobs Bank" For Telecommuters 12. Discount Subscriptions 13. All Of The Above 14. Other

Your Future Telecommuting Plans:
1. Continue 2. Stop (Why? When?) ____________________
____

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When you purchase an Okidata 24-Pin Dot Matrix printer or LED Page Printer, you will receive a United Airlines travel certificate good for one year. What's more, Okidata now features the brand-new OL400e. It's the perfect personal printer for individual PC users. The OL400e offers fast LED output, compact size, an unbeatable 5-year printhead warranty and a surprisingly affordable price.

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Certificate Usage	Valid for a ticket of $200+	Valid for a ticket of $300+	$50 each on two tickets of $300+
Discount Travel Certificate is assignable; Saturday night stay not required; no blackout dates apply.			

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common sense to keep your telecommuting from bothering your neighbors.

RECOMMENDATIONS FROM TELECOMMUNICATIONS FOR CLEAN AIR

The Telecommunications for Clean Air Project, sponsored by the Institute for Local Self Government and the South Coast Air Quality Management District, has issued a technical report which details a series of recommendations for "basic equipment packages" to be installed in convenient locations for use by local government employees who presently travel several times a week, or more often, to attend meetings 10 to 20 miles away, or more. Use of this equipment to telecommute to these meetings would be easier, faster, and far cheaper than physical travel. Private business may do well to consider these recommendations as a means of improving its own cost-effectiveness.

Basic Equipment Package 1—The Local Site: Fax machine, computer and modem, small group audio conference unit (a speakerphone module built to accommodate up to half a dozen people). Cost: $6000 per site. This is the basic equipment that allows you a minimum level of telecommuting connections to virtually any meeting anywhere.

Basic Equipment Package 2—The Sub-Regional Site: Fax machine, computer and modem, electronic bulletin board, 9-port audio conference bridge, link to a larger "hub" meeting site. Cost: $23,000 per site. The bridge allows you to run an audio conference. The link to the "hub" site allows people to "bring their resources with them" when they hold a meeting at larger facilities, and also to allow groups of people to telecommute to meetings held at larger facilities.

Basic Equipment Package 3—The "Hub" Site: Fax machine, large group audio conference unit, document teleconferencing unit, desktop video conferencing unit. Cost: $28,000 per site. This equipment supports relatively large and important meetings, perhaps supported with connections to level 2 and level 1 equipment packages. People might have to drive 10 to 20 miles to get to the "hub" site, but this eliminates the need to drive 60 miles or more to the physical location of the meeting. Meetings tend to be broken up into simultaneous group meetings all linked electronically.

Basic Equipment Package 4—The Regional Site: Fax machine, two large group audio conference units, 9-port audio conference bridge, arrangement with commercial audio bridge company, computer and modem, electronic bulletin board, document teleconferencing unit, desktop video conferencing unit, meeting room video conferencing unit, private broadband network or access to commercial dial-up service (such as ISDN or switched 56kbit). Cost: $90,000 per site. This is a site in each of the region's major central business districts.

Naturally, you should reevaluate these equipment packages as costs decline and as new technologies reach the marketplace. For more information, contact Project Director Wally Siembab, at (310)645-1129. ■

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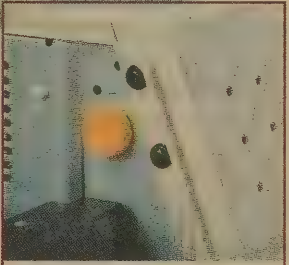

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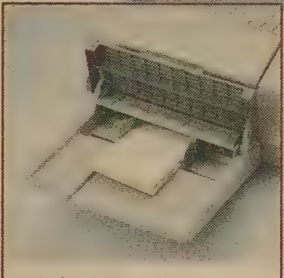

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Tax Planning For Software Developers And Programmers

How To Best Take Advantage Of Independent Contracting

BY DAVID A. SIMON, CPA and JENNIFER ROBIN CHERNISS

RESOURCES:

David A. Simon
Certified Public
Accountant
Oakland, CA
(510)893-5753

Internal Revenue Code
Section 1235
and regulations
thereunder
Revenue Ruling 87-41,
1987-1 C.B. 296, 298-99

Last month in a look at the tax benefits, pitfalls, and options of incorporating as a software developer, our heroic software engineer Eddy had been convinced that incorporation could be wonderful from a tax perspective. Corporate tax advantages include low tax rates (15% on the first $50,000 of income) and the opportunity to accumulate income in the corporation, thereby postponing individual income taxes and hopefully reducing employment taxes as well.

Unfortunately, every rule has its exceptions, and our hero found himself inextricably tangled in a web of complex limitations that, one by one, vaporized those tax benefits. Ed, Inc.'s software income couldn't quite meet the "active business computer software royalties" test. As a result, a 28% personal holding company tax loomed ahead, a penalty added on top of the regular corporate income tax.

Disappointed but wiser, our hero saw that working in software had its tax disadvantages, and began to feel that he had foregone a great opportunity by not pursuing a less stinging career in bee keeping. The tax benefits of incorporating would simply not justify the cost and hassles.

(If you missed Part I, call my office for a complimentary reprint of this article.)

For software developers, the trend toward being an independent contractor rather than an employee is growing. These days many employers, from multinational manufacturers to small, "virtual" entities aiming to bring their first product to market, are doing all they can to avoid hiring employees. Indirect costs associated with each additional employee—taxes, benefits, all the contractual and tort burdens and risks—are high. And, as employers see it, things can only get worse. Under universal medical coverage plans currently explored by the Clinton administration, large employers may bear most of the cost for that coverage.

Among my unincorporated clients, I'm seeing developers like Eddy who would be earning perhaps $60,000 a year (roughly $30 per hour) as computer programming employees, now regularly making $50 to $60 an hour on long term, renewable contracts, working out of their home. Companies are willing to pay big premiums if they can structure a deal as an independent contract rather than hiring an additional employee.

As we'll see later in this story, simply because a relationship is called an independent contract doesn't mean it will be respected as such for tax purposes. But, assuming it is, an independent programmer would likely be subject to considerably more taxes than would an employee. For 1992, federal tax liability for an unmarried independent contractor with net business income (after all business expenses) of $55,000, and no other income or deductions, was a whopping $17,646, of which $7,771 went to self-employment taxes; and that doesn't count state taxes.

The tax law, however, distinguishes a computer programmer, who is paid for providing services, from a software developer, who assumes the risk of developing a product, then later sells it. A computer programmer who is paid only for her services often fares poorly tax-wise. Her fees are subject not only to regular income tax rates, but to employment taxes as well. Possibilities for deferring income are limited. And for cash basis taxpayers, the income is taxable when received.

SECTION 1235 SAVES THE DAY

But a different fate awaits unincorporated software developers. One special benefit available for certain software developers is treatment under Internal Revenue Code Section 1235, which provides that a transfer of property consisting of all substantial rights to a patent receives capital asset treatment.

Taxation of capital assets is typically less painful than tax on ordinary income, such as that received by a programming employee. Capital gains are taxed at favorable rates, and are not part of income for employment tax purposes. What's more, taxable income usually isn't realized until the property is sold and paid for. This rule offers significant opportunities to structure the deal so as to defer income taxes.

Section 1235 is not limited to a patent that has actually been granted. It also includes patentable intellectual property. It isn't even necessary that application for the patent be made. If the software you're working on is something that would be patentable (if you went to the trouble, expense, and security risk), that's good enough for Section 1235 purposes.

Section 1235 requires that you transfer "all substantial rights" to a patent, "or an undivided interest therein which includes a part of such rights." For many individual software developers, this is hardly a problem. Eddy, for example, formally had an employee relationship typical of most: the employer had "shop rights"—whatever Eddy developed belonged to the employer. When you leave such a job, you can't take the source code with you, even if you wrote it; it belongs to that capitalist opportunist who paid you to write it.

Sometimes software engineers don't want to "give it all away." If you specialize in a very specific area, you may find that by selling all your rights in the source code, you're pretty much putting yourself out of business. On the other hand, if rights are licensed rather than sold outright, the trans-

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David A. Simon, CPA (M.S., Taxation) is in tax and accounting practice in Oakland and writes on a variety of business issues. His clients include professionals and businesses throughout the state. He can be reached at (510)893-5753.

Jennifer R. Cherniss, a free-lance writer based in Berkeley, specializes in making boring technical information seem less so.

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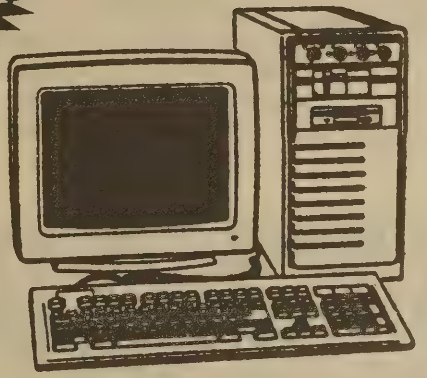

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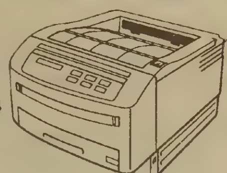

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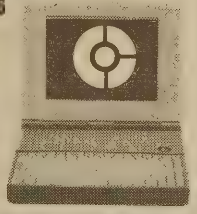

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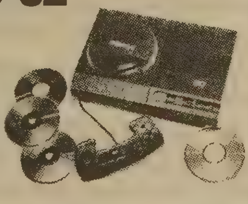

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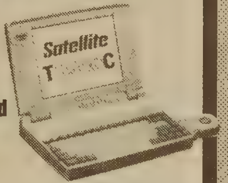

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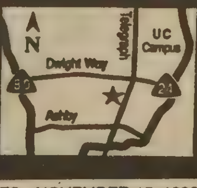

fer won't qualify under Section 1235.

Even this problem can be worked around. If you transfer a percentage of all rights in the software, this may qualify for capital asset treatment. Under this strategy, you can sell any number of "undivided interests" rather than merely granting a nonexclusive license, which would be taxed as royalties. In substance, the two are pretty much the same, so little sacrifice is made in obtaining the more favorable tax status. Section 1235 treatment may be denied, however, if the buyer is restricted from sublicensing.

Only individuals (i.e., not corporations or other entities) qualify for Section 1235 benefits, and you must be the person who created the property. The employer of the creator doesn't qualify.

Also, prior to your receiving payment, the "invention" must have been tested and operated successfully under operating conditions. This may occur before or after the patent is applied for (although it is not necessary to apply for a patent). Once commercial exploitation begins, the patent no longer qualifies for capital asset treatment.

Armed with this knowledge, Eddy's accountant stopped him before he went through with his plan to incorporate. He structured a software development agreement with Suishi Electronics, the primary client, whereby Eddy would design, develop, and test a program meeting Suishi's specifications, for which Suishi would then purchase a 75%, undivided interest in all rights to the source code. The proceeds of Eddy's sale would then be treated as a capital gain for tax purposes, thus avoiding employment taxes and higher income tax rates.

Taxation of capital assets is typically less painful than tax on ordinary income, such as that received by a programming employee.

One nice thing about Section 1235 is that the law and governing regulations are only a few pages in length. If you'd like a copy, please feel free to call my office.

"TRUE" INDEPENDENCE

All this planning is for naught if the IRS considers you an employee. Some people seem to think that just because a written agreement says your relationship is that of an independent contractor rather than an employee, that's good enough.

Employers enjoy a number of benefits by classifying workers as independent contractors, and so will usually write an understanding of nonemployment into the contract, especially since the arrangement tends to be detrimental to the worker. Such provisions are not conclusive, however, and the IRS might not respect this classification.

The tax consequences to the employer that hinge upon the recognition, for tax

continued on page 248

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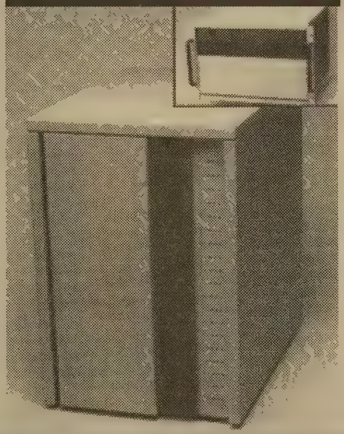

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intel inside

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Testry Corner:

- -Thinking about PCI? Hold on. We have tested some 486 PCI motherboards with PCI Video and PCI SCSI. NONE OF THEM PERFORMS ANY BETTER THAN VLB YET! Obviously, PCI is not mature, nor popular yet. It's not like VLB, PCI is not downward compatible, it can't support ISA card. A PCI motherboard will leave you 4 ISA slots if PCI slots are not being used. Willing to pay more for an immature product? We aren't yet.
  $20 bucks more for a 40DX than the 33DX. AMD 486-40DX CPU is no worst than Intel 33DX. Afterall, $20 for 20% more CPU performance and it is pin to pin compatible with Intel, why not?
- Why not 33SX but 33DX? The difference is only a Math-co on DX and if you are not using Auto-CAD, running spreadsheet or an scientific programs that require Math-co, then save that hundred dollars for a modem or a tape-backup. SX and DX perform same!
  Interlaced and non-interlaced monitor? Non-interlaced scans its electronic beam back and forth, while interlaced scans alternatively. This happens only in 1024x768 resolution with a 14" monitor. If 1024x768 is too fine for your eyes, then you don't nee a NI unless price is not a concern
- Regular 30Pin SIMM is a 8-bit device, you group four of them together to make it 32Bit in order to talk to the 32Bit 486 CPU. That why you always have to populate a 4-slot bank with the same type of SIMM on a 486 motherboard. Most motherboard has 2 banks of 4 slots each. Combination could be 1+0M, 1+1M, 1+4M, 1+16M, 4+0M, 4+4M, 4+16M, 16+0M, 16+16M. If you want 8MB, then slots will be all filled and jeopardize your future upgrade. Or you can get 4MB now and wait until memory gets cheaper, then buy another 16MB to make it 20MB. Same theory applies to 72Pin SIMM but 72Pin SIMM is just 4 of 30Pin SIMM physically combined together. And 8MB and 32MB 72Pin SIMM are called double density, 8 of 30Pin SIMM combined.

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I was impressed and appreciated their technical expertise. This is the only "technically sound" PC store! Remember, selling a PC is not like selling eggs in supermarket, knowing what they are selling counts! Afterall, who else can answer questions like:"co-existence of IDE and SCSI;" difference between DX and DX/2," VESA mode and VESA LOCAL BUS." Nobody beats them in BayArea, nobody!
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Orchid 32Bit VLB IDE Controller with 2S/1P/1G
Orchid Fahrenheit 1280+ VLB 1MB S3-805 ChipSet
14" 1024X768NI 0.28DP Monitor
Premium Mini Tower 230W PS
101 Key Enhanced Keyboard

3SX-$1246 **50DX/2-$1431**
3DX-$1371 **66DX/2-$1568**
0DX-$1391

Orchid Superboard 486 VLB, the mini baby AT-sized motherboard built with an unrivalled feature set. This unique motherboard rounds out Orchid's family of VLB products to provide complete VLB solution. With Orchid VLB I/O card and Orchid Fahrenheit 1280+ VLB Video card, you simply won't find anything that perfectly matched. A complete VLB solution from Orchid!

486 ISA VLB

READY TO GO

○486 ISA 3-Slot VLB 256K Cache Motherboard
○4MB 70ns SIMM RAM (1Mx3 SIMMx4)
○1.2M & 1.44M Teac Floppy Drives
○213MB IDE Western Digital 64K Cache Harddrive
○Promise DC2000 32Bit VLB IDE Controller with 2S/1P
○SPiDER VLB 1MB Windows Accelerator
○14" 1024X768 0.28DP Monitor
○Premium Mini Tower 230W PS
○101 Key Enhanced Keyboard

33SX-$1129 **50DX/2-$1314**
33DX-$1254 **66DX/2-$1451**
40DX-$1274

Don't just blindly look for lowest price! It makes no sense to buy an VLB system without harddisk controller and video card on VLB. You aren't taking the advantage on the VLB! Be careful, from time to time, you would see ads selling cheap VLB without real controller and video card. Don't take the bait! Or you end up losing money to upgrade.

Components/Upgrades

Motherboard without CPU: (Call for CPU Prices)

386/486 ISA 128K - 386/486 CPU support	$100
486 ISA VLB 256K - 3 VLB slots P24T support	$110
486 AIR-UL ISA VLB 256K - 3 VLB slots, upto 50MHz Upto 64MB, ZIF, P24T support, bus-master	$160
Memory Expansion Card 32MB for AIR-UL	$90
486 AIR-MIS ISA VLB - Bus-master, w/ VLB IDE, FD, 2S/1P & VLB SCSI-2 w/ Adaptec 6260 chpset, Upto 64MB by 72Pin SIMM, ZIF, P24T support (256K/512K)	$325/405
486 AIR-EI Full EISA VLB - 3 VLB Slots, upto 50MHz Upto 256MB by 72Pin SIMM, ZIF, P24T support 8 EISA slots + 3 VLB (256/512K)	$340/420
586 AIR-MI Pentium VLB - 3 VLB bus-mastering Slots upto 256MB by 72Pin SIMM, 60/66MHz selectable w/ VLB IDE, FD, 2S/1P & VLB SCSI-2 w/ Adaptec 6260 chpset, Green PC Clock SlowDown feature (256K/512K) 15NS Cache	$625/725
486 Orchid VLB SuperBoard 256K 2 VLB slots, bus-master	$140
486 Diamond FastBus VLB 256K Cache - uses 72Pin SIMM Onbrd IDE I/O, 2 VLB slots, ZIF, Bus-master	$280
486 Micronics ISA VLB JX-30 256K w/ CPU, VLB IDE, I/O 486-33DX/50DX2/66DX2	$700/780/885
486 Micronics EISA VLB 256K w/ CPU - Top of the line! 486-33DX/50DX2/66DX2	$870/950/1160

CPU & Memory (Please Call, Subject to Change Daily!)

Pentium P5-60MHz/66MHz CPU	$Call
Intel 486-33SX/33DX/50DX2/50DX/66DX2	$Call
AMD 486-40DX (Pin to Pin Intel Compatible)	$Call
Cyprix 486 Family (Pin to Pin Intel Compatible)	$Call
1MB DRAM (44256-70ns DRAMx8)	$40
1MB VRAM (44256-70ns VRAMx8)	$60
1MB RAM (256K-70ns SIMMx4)	$Call
4MB RAM (1M-70ns SIMMx4)	$Call
16MB RAM (4M-70ns SIMMx4)	$Call
72Pin 70ns SIMM (4/8/16/32MB)	$180/355/640/1260

I/O Card, Controller Card, Network Card

Single/Dual Printer Card	$10/15
AT I/O 2S/1P/1G	$12
AT I/O 2S/1P/1G w/ 2 HiSpd UART 16550's	$45
4 Serial Port Card with Cable	$65
16Bit IDE 2FD/2HD Controller	$12
16Bit IDE 2FD/2HD with 2S/1P/1G	$14
16Bit IDE 4FD/2HD 2.88MB support	$29
16Bit IDE 4FD/2HD 2S/1P 2.88MB support	$49
IDE Caching Controller Upto 64MB, 2HD/4FD	$105
Promise DC-2000 VLB IDE w/ I/O	$35
VLB IDE 2FD/2HD w/I/O Support 2.88MB, with 2 HiSpd UART 16550's, 1 Parallel	$75
Orchid VLB IDE Controller w/ 2S/1P/1G	$55
Promise DC-4030VL VLB IDE w/ 0MB Cache	$130
UltraStor 34F SCSI-2 VLB Bus-Mastering	$265
UltraStor Software Driver Kit for 34F	$45
BusLogic BT445S VLB SCSI-2, Bus-Mastering w/ Floppy Ctrl & Driver Kit	$265
Adaptec 1522B/1522BK SCSI Controller	$80/140
Adaptec 1542C/1542CK SCSI Controller	$185/240
Adaptec NEW 2742T EISA RISC-based SCSI-2 Controller w/ Dual Channel supporting 14 HDs, 2.88M	$365
w/ 2.88MB Support & Driver Kit	$305
AIR NEW QAccess Fast SCSI-2 VLB Controller w/ VLB IDE/FD and 2S/1P/1G	$145
AIR VLB 32Bit NE-2000 Ethernet Adaptor	$250
Ethernet NE2000 Adaptor Coaxial/10 Base-T	$48

Video Card:

Monochrome Graphic Printer Card	$12
16Bit 512K/1MB Trident SVGA 1024x768	$35/50
16Bit 1MB Tseng-4000 72Hz 32K Color	$75
Tseng-ET4000/4000-W32 VLB 1MB 16.7M Color	$95/125
SPiDER Cirrus Logic VLB 1MB/2MB	$88/128
SPiDER Cirrus Logic VLB Plus 1MB/2MB	$112/152
SPiDER Cirrus Logic VLB PRO 1MB/2MB	$120/160
SPiDER Black Widow VLB 1MB/2MB	$215/275
Orchid Fahrenheit 1280 PLUS ISA 1MB	$145
Orchid Fahrenheit 1280 PLUS VLB 1MB/2MB	$135/175
Orchid Fahrenheit VA VLB 1/2MB	$175/215
Orchid Celsius VLB 1MB/2MB	$215/275
Orchid P9000 VLB 3MB	$335
Diamond Speedstar Pro VLB 1MB	$110
Diamond Stealth 24 VLB 1MB DRAM S3-805	$155
Diamond Stealth Pro VLB 1/2MB VRAM S3-928	$255/315
Diamond Viper VLB 2MB VRAM 44M Winmarks	$365
ATI Ultra Pro VLB 2MB VRAM 30M Winmarks	$390

Monitor:

14" Monochrome Monitor	$90
Impression 14" 1024x768x0.39DP	$205
Impression 14" 1024x768x0.28DP	$245
Impression 14" 1024x768NIx0.28DP	$265
Impression 17" 1280x1024x0.26DP, BEST BUY!! Exactly MAG 17F like, just logo is different!	$865
KFC 14" 1024x768x0.28DP	$245
KFC 14" 1024x768NIx0.28DP	$265
KFC 14" Multisync, 1024x768NIx0.28DP Digital-Control, Non-Glared	$355
KFC 15" Multisync, 1280x1024NIx0.28DP Digital-Control, Non-Glared, Flat-Screen	$420
KFC 17" Multisync, 1280x1024NIx0.26DP Digital-Control, Non-Glared, Flat-Screen	$740
MAG 15F 15" 0.28DP 30-68KHz, 1280x1024NI	$475
MAG 17F 17" 0.26DP 30-68KHz, 1280x1024NI	$905
Viewsonic 6E 14" 0.28DP 1024x768NI	$300
Viewsonic 15 15" 0.28DP 1280x1024NI Digi.Cntrl.	$475
Viewsonic 17 17" 0.28DP 1600x1280NI Digi.Cntrl.	$1025
Viewsonic 20 20" 0.28DP 1600x1280NI Digi.Cntrl.	$1635
Viewsonic 21 21" 0.26DP 1600x1280NI Digi.Cntrl.	$1900
Nanao F340iW 15" 0.28DP 1024x768NI	$655
Nanao F550iW 17" 0.28DP 1280x1024NI	$1055
Nanao F560i 17" 0.26DP 1280x1024NI	$1625
Nanao F660i 20" 0.31DP 1600x1280NI Trinitron	$2375
Nanao F750i 21" 0.31DP 1600x1280NI	$2015
NEC 3FGe 15" 0.28DP 1024X768NI	$575
NEC 4FGe 15" 0.28DP 1024x768NI 76Hz	$675
NEC 5FGe 17" 0.28DP 1024x768NI	$1070
NEC 6FG 21" 0.28DP 1280x1024NI	$2300
NEC 3FG/4FG Filtering Lense	$70
NEC 5FG/6FG Filtering Lense	$90/170
Sony 1430 14" 1024x768 0.25DP	$565
Sony 1730 17" 1024x768 0.25DP	$960

Add and subtract to make your dream machine!

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Zoltrix Sendfax 96/24 Int. 9600 Fax/2400 Data	$27
Zoltrix Standard Int. 96/24 9600 S/R Fax/2400 Data + Bitfax for Windows + MNP5 Software	$48
Zoltrix 14.4K S/R Fax/Data V.32Bis, V.32, V.42Bis, V.42, MNP5 + Bitcom + Bitfax Internal/External	$135/165
US Robotics Sportster 14.4K Data/Fax V32.bis, V.32, V.42 Internal/External	$180/205
Intel Fax Modem 14.4K Internal/External	$175/195

Floppy Drive/Tape Backup

Teac 1.2M 5.25"/1.44M 3.5"/2.88M 3.5"	$46/38/90
Teac Dual 1.44M & 1.2M	$115
Toshiba 2.88M 3.5"	$58
Conner 250MB TapeBackup Internal w/ DC2120	$155
Colorado 250MB TapeBackup Internal	$170
Tape Cartridge DC2120 for 250MB QIC-80	$16

Keyboard/Mouse/Software/Chassis/Misc

101 Chicony Enhanced	$20
KeyTronic 101 Enhanced	$30
Focus 2001 101 Enhanced Click	$36
Focus 8000 111 with Calculator	$40
Focus 9000 129 Programmable with Calculator	$70
NorthGate OmniKey 101/102	$70
NorthGate OmniKey Ultra	$95
Ergonomic 101 Enhanced Keyboard	$70
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Logitech Mouseman Cordless	$85
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MicroSoft Ergonomic Serial Mouse V2.0	$55
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Standard Mini Tower with 200W PS	$55
Premium w/PS Mini/Dsktp/Med/Full Tower	$70/75/95/115
Printer Cable 6"/10"/15"	$5/7/9
486 CPU Cooling Fan	$15
Chassis Second Cooling Fan 3" or 3.5"	$20
Motherboard External Battery	$5

MultiMedia

CD ROM Drive:

Toshiba XM-3401B SCSI 256K Cache, 200ms 330KB/Sec, Multi-Spin/Spd Int/Ext	$355/505
NEC CDR-84JD-1 SCSI 280ms 300KB/S Int/Ext	$355/515
NEC NEW MultiSpin 3X CD-ROM reader	$Call
Texel SCSI 245ms Multi-Spin.Spd Int/Ext	$375/469
Mitsumi 350ms w/controller - need no caddy	$155
Panasonic CR-562 320ms - need no caddy	$179
DTC CD-ROM Kit w/ 3150 SCSI Adaptor & Sftwre.	$60
CD-ROM Caddy	$6

MultiMedia Package:

Creative Labs Multimedia Starter Kit includes: CD ROM, Snd Blaster Pro, MS BookShlf, etc.	$375
Creative Labs Discovery CD 8 Upgrade Kit	$360
Creative Labs Discovery CD 16 Upgrade Kit	$425
Creative Labs Edutainment CD 16 Upgrade Kit	$480
MediaVision Fusion CD 16 Internal Kit	$465
MediaVision Pro 16 Multimedia System	$780

Sound Card

ProAudio Spectrum 16 w/ SCSI Interface	$149
ProAudio Studio 16 w/ SCSI Interface	$209
Pro Movie Spectrum	$279
Creative Labs Sound Blaster Deluxe	$89
Creative Labs Sound Blaster Pro Deluxe	$115
Creative Labs Sound Blaster 16	$185
Creative Labs Sound Blaster 16 ASP	$205
Creative Labs Video Blaster	$309
Creative Labs Wave Blaster	$230
Orchid Sound Wave 32	$225

HardDisk

213MB IDE WDAC1210	$195
250MB IDE WDAC2250	$215
340MB IDE WDAC2340	$285
420MB IDE WDAC2420	$378

213MB IDE 7213AT 64K 15MS	$208
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345MB SCSI 7345S 64K 14MS	$355
540MB SCSI MXT540S 256K 8MS	$678
1.2GB SCSI MXT1240S 512K 8MS	$1130

Quantum

240MB IDE LPS240A 256K	$220
525MB IDE LPS525AT 256K	$520
525MB SCSI LPS525S 256K	$520
[illegible]00MB SCSI P1[illegible] 256K 10MS	$745
1.0GB SCSI P1050 512K 10MS	$8[illegible]0
1.2GB SCSI P1[illegible] 512K 10MS	$1068
1.8GB SCSI P1800 512K	$129[illegible]

Toshiba

877MB MK438FB SCSI-2 12MS	$695
1.0GB MK[illegible]FB SCSI-2 12MS	$[illegible]
1.2GB MK538FB SCSI-2 12MS	$845

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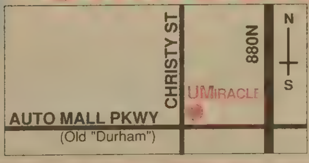

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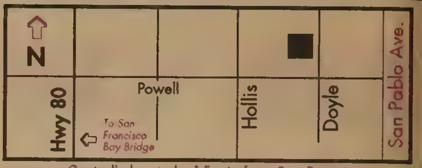

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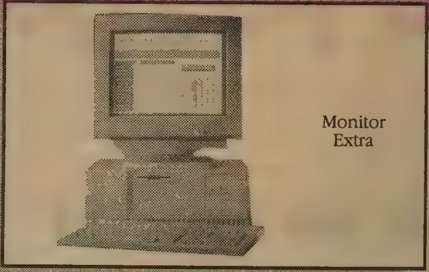

To help you control your network, HP has designed its servers to be easy to manage and administer. Every NetServer LM includes HP NetServer Assistant server management software that helps you prevent problems before they occur. Computer-intensive tasks aren't a challenge for HP NetServer LM servers because they offer your choice of the Intel 486DX, DX2, or the high-end Pentium™ processor when available. Backed with HP's renowned reliability and support, the HP NetServer LM Series is the safe bet for your high-performance network needs.

Servers That Deliver:

- Improved manageability with built-in features and software
- Continuous availability through fault tolerant data storage
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- World-class HP support services and 3-year warranty.

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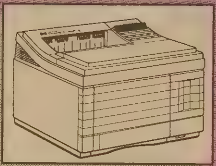

- 600 dpi print quality at a 300 dpi price
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- Fast 8-ppm printing
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- Full network capabilities

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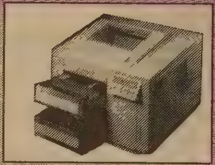
HP LaserJet 4si

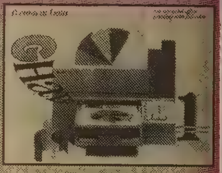


This 17 pages per minute, high-performance, 600dpi network printer offers the power & performance to meet users' expanding needs. Add interfaces, memory, paper-handling at any time.

HP LaserJet 4SiMX

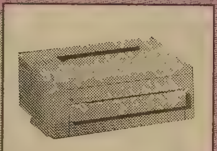
This high-speed, high volume, high-resolution laser printer is designed for multiple network environments.

HP DeskJet 1200C/ 1200C/PS Printer



- 600x300 dpi black text with Resolution Enhancement Technology
- 300dpi full color printing
- 45 internal scalable typefaces for Windows and MS-DOS® 35 additional typefaces for PostScript™ printing
- Color PCL5 language and a slot for Hp LaserJet typeface cartridges
- 2MB Memory, expandable to 26MB

HP LaserJet 4ML



The HP LaserJet 4L printer is everything you want in a laser printer. Complete. Simple to operate. **And** affordable.

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- Up to 4 pages per minute
- 300x300 dpi with further refinement by HP Resolution technology
- 26 Scalable typefaces

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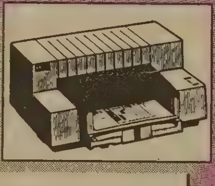
HP InkJet Printers For PC Deskjet 500/ 500C/550C



- 3 Year mfg. warranty
- Extremely quiet operation
- 300 dpi printing

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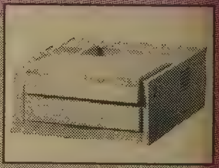

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- HP Printer Font Cartridges
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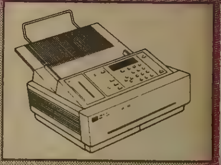

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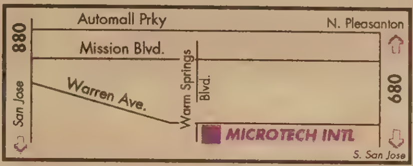

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Keyboard & Monitor sold seperately

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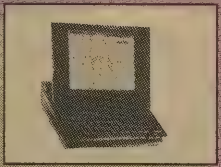

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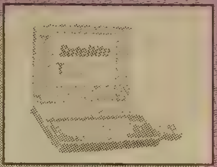

T4600C/200

- Active Matrix Screen
- 486SL/33
- 4MB RAM

T4400C/200

- Active Matrix Screen
- 200MB HD
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- 3 hr. battery

T1950/1950CS/1950CT

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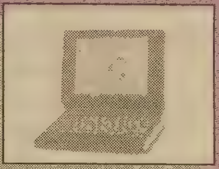

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- Parallel Serial Ports
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- ZIF Socket for CPU
- 4MB RAM
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486DLC-33

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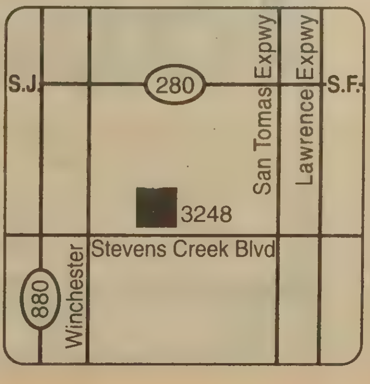

Betting On A LAN

State Lotteries And Gambling Operations Push The State Of The Art

BY YACCO

Networking is becoming more and more involved in aspects of your everyday life. Not long ago I wrote a column about networked games—you could challenge your friends on a net, but only if their computers were connected to yours on the same LAN.

As interactive TV and other new technologies arrive, they'll connect everyone with a high-bandwidth link. One day you may even be able to have a Friday night poker game with friends located around the country—if not over the television, over a public information network like CompuServe or America Online.

When something like that happens, it will almost certainly have some government jurisdiction, or several cooperating jurisdictions, acting as the dealer, collecting ante and bets, and distributing the proceeds directly into the accounts of the winners. Naturally, they'll also collect a fee for the service, just as casinos do now in states where poker is legal.

If that sounds farfetched, reflect that more than half the states already have lotteries. Many of those lotteries are using the same networking technology used by business and industry.

And lottery-ticket machines aren't the only type of gaming equipment running on a network. Recently, Colorado State Senator Sally Hopper placed a pair of quarters into a Quartermania machine in the Gold Mine Casino in Black Hawk, while at that very moment, Mayor Dick Allen did likewise at the Dostal Alley Casino in Central City, and Representative Ken Choubler did the same at Johnny Nolan's in Cripple Creek. The three legislators were taking the first pull on a system that joins gamblers in casinos around the state. Everyone playing those machines has a chance at the same $200,000 Quartermania jackpot. And in Norway, one of the world's highest per capita gambling countries, systems already direct credit transfers to the accounts of players when they win.

LANS

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REGULATORY HURDLES

However, while the technology for your poker game obviously already exists, you won't be able to ask CompuServe to reserve your seat for a while yet. It may be some time before all the legal and cultural hurdles are overcome.

Although Pennsylvania recently lost its latest judicial round in an attempt to prevent sales of tickets from competing state lotteries within its borders, a joint venture of American Express and AT&T to sell lottery tickets by phone is still bogged down by Federal laws. One industry insider characterizes these laws as falling behind the times. "Federal law will become outmoded," says Dan Bower, chairman of Video Lottery Technologies (VLT), and a member of the National Problem Gambling Board (an industry association for helping people with gaming-related behavioral problems), "just as you can now advertise across state lines where states have gambling."

ONLINE GAMBLING: BIG BUSINESS

Nevertheless, even if the required social changes are a long time coming, state lotteries alone are already a $10.5 billion business.

The networks these industries run on are big business too. In Colorado, for instance, the number of Quartermania systems came to 120 machines in nineteen casinos by the end of the first week. (That number is growing rapidly, and the game is already being played in Nevada, South Dakota, New Jersey, and Mississippi.)

All the Colorado machines are connected over phone lines to a secure host processor. It monitors the level of play, computes the jackpot for display over the machines, and automatically reacts when any machine hits the big winner. It then locks out the machine and notifies the casino. (The largest Quartermania jackpot to date was $2.4 million paid at Bally's Casino Resort in Las Vegas.)

State lotteries have designs and security needs similar to those of the networked casino games. In Florida, for example, sales of state lottery tickets produce two thousand secure transactions each second. Nor are conventional lotteries the only type of game being run by the states. Major vendors of lottery-ticket machines also provide states with video-game machines like those used in casinos. They may play poker, blackjack, reel games (slots), and others—or combinations of many. These video games typically have an internal transaction record that must be reconciled with summaries that are sent to the host. Some jurisdictions require full transactions to be kept on both ends.

VLT, which claims nearly 40% of the market, operates in excess of eighteen thousand such video terminals through its Video Lottery Consultants subsidiary. The machines operate, in more than six thousand retail establishments, on behalf of fifteen jurisdictions in the US, Canada, Australia, and Iceland.

NUTS AND BOLTS

Either type of lottery system requires networking, and the latest gaming systems are typically based on familiar technologies. The states in particular require state-of-the-art systems because their equipment is operated by retailers, or by the players themselves, and not continuously monitored by state personnel.

VLT's new MasterLink system, which was announced at the North American State and Provincial Lotteries conference in Calgary, Alberta, this past September, is such a system. It employs an open architecture based on UNIX and the IBM RS6000 and other RISC workstations. The MasterLink software is based on industry standards—including ANSI, OSF1, and POSIX—for easy porting between hardware platforms, and for the integration of future technologies like interactive television, telephone key-pads, and other new terminal types.

A typical lottery network, leased to a jurisdiction by VLT, runs on multiple RS6000 single-processor machines. The

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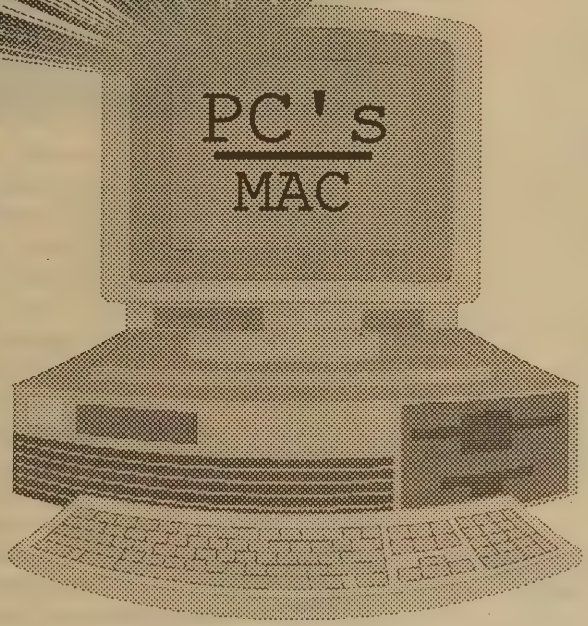

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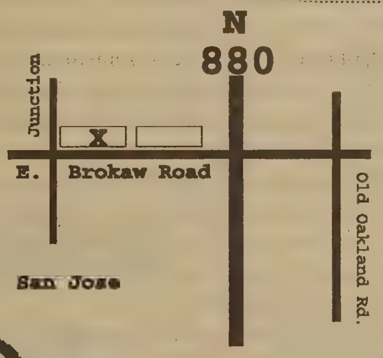

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In Norway, one of the world's highest per capita gambling countries, systems already direct credit transfers to the accounts of players when they win.

MasterLink software has two parts. The Games Delivery part is responsible for transaction logging and providing a redundant system. The Information Management part logs play statistics. An Oracle database provides SQL access to the data accumulated on games, retailers, and players.

The games themselves are run by online transaction processing (OLTP) system, which is not essentially different from the automated teller system where you bank. The game terminals are linked to communications front-end processors (FEPs), which may be polled asynch or nonpolled via HDLC protocol. The FEPs are rack-mounted 486-based UNIX PCs containing a pair of eight-port Emulex DCP-286i boards to which the terminals are connected.

The backbone of the network is a T1 line scaled to the size required for the particular jurisdiction. It could be switched 56K or fractional T1, for example. The terminals are connected to the FEPs over leased or dial-up 1200 to 9600bps lines—also depending on the needs of the jurisdiction. The front ends poll the terminals and consolidate packets which are sent over T1 using TCP/IP to connect to the hosts. The Data Encryption Standard (DES) is used to encrypt a validation segment for transmission security, in the US or where not prohibited by law. The data segment may optionally be encrypted if required.

There are other advantages to this network design. For instance, VLC's video games, which are based on Motorola 68000 processors, can also be modified over the network. They have a universal appearance and touch screens which allow them to be programmed for the different games—poker, blackjack, keno, reel, off-track betting, etc. The host can instantly upload them without the intervention of service personnel. That undoubtedly contributes significantly to achieving what VLT calls "the highest return on investment and lowest down time in the industry."

In Florida, another VLT subsidiary, Automated Wagering International (AWI) installed an online system using a T1-ring backbone. The system demonstrated its resiliance in May 1989, when a construction crew cut through cables that included its link between Tallahassee and Jacksonville. The network's built-in redundancy allowed it to resume operation within seconds, while certain key state government offices remained without phone service for as long as six hours.

Lotteries are spreading to an increasing number of jurisdictions as they find this form of gambling a relatively painless source of revenue, and those states are constantly looking for new ways to keep players interested. As Dr. Marcia Mann, secretary of the Florida Lottery, says, "I look at us as part of the entertainment industry. Where else are you going to have fun for a dollar?"

The day you and your friends can play that game of online poker may not be here now, but it could arrive sooner than anyone expects. ■

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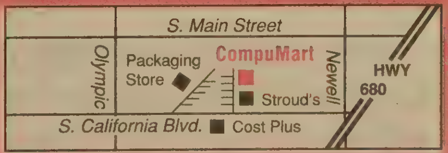

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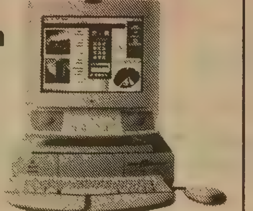

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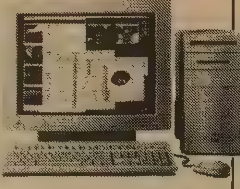

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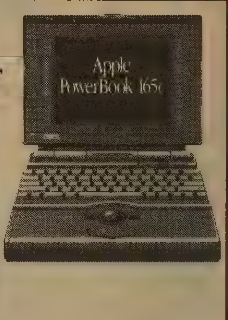

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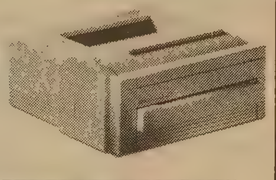

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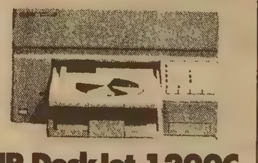

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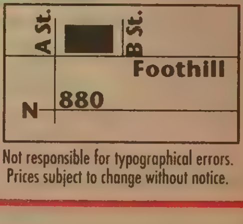

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Have Your Tickets Out And Ready:

The Kerberos Authentication System—Keeping Unauthorized Users Off Your Network

BY BENNETT FALK

UNIX

The paradox of computer security is that the most secure computer seems to be one that is never used. What you do to enforce security and how you calculate the tradeoffs between security and usefulness both depend in large measure on what kind of computer you're working with and what the security risks are.

If the computer you use has only one user and isn't connected to a network, you can secure your computer like you would any other piece of property: when you aren't using it, you simply lock the computer up in a drawer or cabinet or office.

Multiuser systems pose a different set of problems. On multiuser systems, benign, unintended interference between authorized users is at least as likely a hazard as a malicious attack against the computer. Assigning names to users and marking the files and directories they use with those names helps to manage benign interference, but names alone are not really enough.

On most systems, user identification includes the role of "all-powerful administrator" (known as "root" on UNIX systems) to sort things out. A kind of social contract exists among the system's users: everyone agrees not to usurp the administrator's power, and not to walk into the computer room and reboot the system arbitrarily.

Preventing malicious or unauthorized use of a multiuser computer is a trickier problem than securing a single-user computer. Certainly the CPU could be locked up in a computer room (indeed, many are). But it would be difficult (and counter-productive) to keep under lock and key all the terminals and modems that make multiuser systems attractive. Locking the system away entirely would severely reduce its usefulness. Typically, multiuser systems are protected by virtual keys: private passwords known only to the authorized users of the system.

Passwords are a mechanism the computer can use to verify the identity of a user. Since a lot of us are not terribly confident of who we are in the first place, being asked, "But who are you, really?" by a computer is likely to be an occasion for anxiety. Fortunately the computer ignores personality and recognizes you as yourself only after you've provided the correct user name and password. Of course, this has its flaws: the computer would happily recognize as yourself anyone with your user name and password. Consequently passwords should be chosen with care: words that can be easily guessed (your last name, for example) and words that can be easily found (anything in /usr/dict words, for example) should be avoided.

THE NETWORK IS THE PROBLEM

Distributing computer resources over a network only makes this problem worse. A user on any computer within a network can request services from other network hosts. (A host is simply a computer that participates in a network.) In most cases, the host receiving the request has no way of independently verifying the identity of the user. The client computer (from which the request was made) will vouch for the user, but it may not be trustworthy, particularly in a network that includes desktop workstations.

The emergence of workstations on networks has wreaked havoc with computer security measures. Workstations look like single-user computers, but being connected to a network makes them practically impossible to lock up. Most UNIX workstations are multiuser computers in their own right, but they can be rebooted as easily as any personal computer. Ease of rebooting is important because it provides access to the powerful "root" user ID. Because root can assume any other user identity, it's relatively easy to get unauthorized access to someone else's account throughout the network. The bottom line is that when a user on a workstation requests some network service (like remote login to another machine, or a client/server application), the user identity attached to the request may not be trustworthy.

KERBEROS

The Kerberos system, developed as a part of Project Athena at MIT, embodies one way of dealing with just this sort of issue. Project Athena, begun in 1983, was a large-scale project to provide computer resources for undergraduates at MIT. The project demonstrated the feasibility of distributed computing and produced a number of tools for client/server computing, user interface technology and computer security. (More information on Athena is available via anonymous ftp at athena-dist.mit.edu.)

The Kerberos system is named after the three-headed dog in Greek mythology that guards the entrance to the underworld. The system exists to verify that the users of networked applications are who they say they are, and to prove the user's identity to any applications that subscribe to the authentication service. Kerberos does this with a password mechanism that is more comprehensive than the password protection of login accounts on any individual machine.

In Project Athena, this authentication mechanism was used to give users access to file servers, print servers, and remote login daemons. As the system has matured, it has been used for other kinds of application services as well, and it is gradually gaining acceptance with commercial software ven-

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dors. Kerberos has also been used for "host to host" authentication, in which one computer must prove its identity to another.

Kerberos has an architecture that lives up to its name. The system consists of an "authentication" server (usually referred to as Kerberos) that runs on a secure machine and a "ticket granting server" (TGS) that manages specific requests from users for services (or applications) that subscribe to Kerberos. The Kerberos authentication server maintains a database containing passwords for each user and each service that requires user authentication.

Authentication happens in five steps. The user is first announced to the Kerberos server. Kerberos provides a ticket that admits the user to the ticket granting server. The user then asks the TGS for a ticket to use some service. The TGS returns a ticket specific to the user and service. And finally, the user presents the ticket to the service.

At each step along the way, precautions are taken to ensure the privacy of communications between the client and all the various servers it must interact with. When a user first attempts to log in to a workstation using the Kerberos system, he or she supplies a login name to a Kerberos client program. The client then sends this login name to the authentication server.

> ***The emergence of workstations on networks has wreaked havoc with computer security measures. Workstations look like single-user computers, but being connected to a network makes them practically impossible to lock up.***

If Kerberos recognizes the name, it generates a unique key (called a "session key") that will later be used to encrypt messages exchanged between the user and the ticket granting server, and a ticket that admits the user to the ticket granting server. The TGS ticket contains a number of things: identifiers for both the client program and the TGS server, the time the ticket was created, its lifetime, the client's network address, and a copy of the session key. This ticket is then encrypted using a key that only Kerberos and the TGS know. The encrypted ticket, along with a copy of the session key for the user, are encrypted a second time with the user's password as a key, and this encrypted message is sent to the client program that is collecting login information from the user.

After receiving this message, the client program prompts for the user's password. The password is used to solve the outer layer of encryption on the Kerberos message, and this gives the client a session key and an encrypted ticket to the ticket granting server. If an incorrect password is entered, the message can't be decrypted, and the user's login attempt fails.

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Once the initial message from Kerberos is decoded, the client begins a dialog with the ticket granting server to get tickets that will admit the authorized user to services that subscribe to the authentication system. The client sends a message to the TGS containing the name of the service the client wants to use, the already encrypted ticket for the TGS, and "authenticator" that is encrypted using the session key just received from Kerberos. The TGS decrypts the ticket and uses the copy of the session key that it contains to decrypt the authenticator.

The TGS then builds a ticket for the client to use the named service. A separate session key is generated for the client and this service to use. The ticket is encrypted using a password that only the service has, and the ticket and the new session key are encrypted using the session key the client shares with the TGS.

Upon receiving this ticket, the client uses its TGS session key to remove the outer layer of encryption. The client then builds another authenticator using the session key it shares with the application, and this authenticator and the ticket are submitted to the application. The application decrypts the ticket to produce the session key and uses the session key to decode the authenticator. If all is well, the client is admitted to the application.

Of course, the whole authentication process must happen quickly: ideally it should not be appreciably more time-consuming that logging in to a normal UNIX system. Like many other programs, Kerberos depends on a fast network in which connections can be opened and closed quickly. Authentication in Kerberos happens in a number of very short dialogs between clients and either Kerberos or the TGS. The dialogs are so brief (and potentially so numerous) that the time required to initiate or terminate a network connection can have a significant impact on the authentication system's performance.

If you're accustomed to the conventional UNIX password mechanism, Kerberos may be quite a shock. Kerberos avoids the need to send unencrypted (or "plaintext") passwords over the network by treating passwords as encryption keys. Rather than send your password to another process for verification, Kerberos delivers a coded message that can only be decrypted with the proper password.

It's worth noting that the tickets granted in Kerberos are valid only for a particular time: if they aren't used in time, they expire and the user must apply for a new ticket. Additionally, each ticket is service specific: it can only be used to access a particular server from a client computer.

Another nifty feature of this architecture is the use of the client as an accomplice in its own authentication. During authentication, Kerberos does not interact directly with the service that is requested: it simply passes on to the client a message that only that service can decrypt. The client relays this message without knowing its contents.

The Kerberos architecture can be easily extended to allow multiple Kerberos servers with different responsibilities to interact. The protocol governing message exchange during authentication will also allow client programs to ask servers for verification.

Kerberos is attractive to commercial software vendors because it works with relatively little input from the user (one password check early on), and it can be incorporated into an existing product with relative ease without disturbing the application software's architecture.

One of the ironies of Kerberos' success is that people assume that it is a general purpose security system. Kerberos isn't a package to perform generic encryption of packets traveling over the network (a service that is probably best left to the hardware anyway). One of the surest ways to undermine a security system is to apply it to a security problem it wasn't intended to solve. ■

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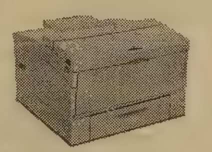

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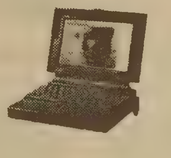

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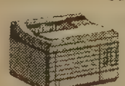

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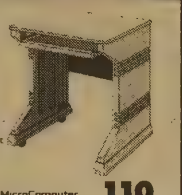

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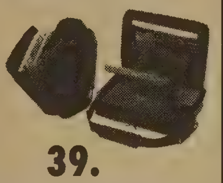

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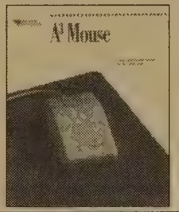

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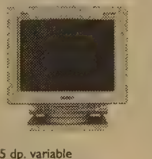

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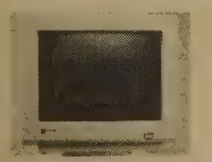

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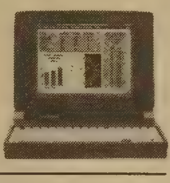

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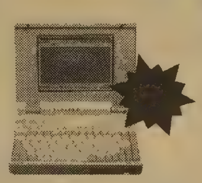

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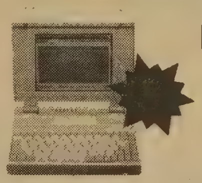

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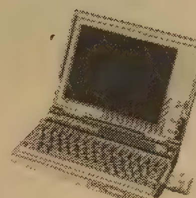

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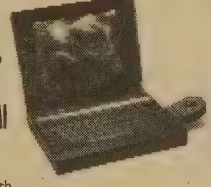

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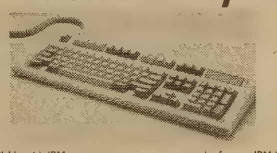

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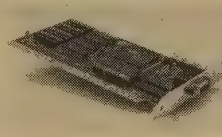

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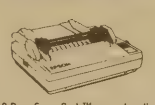

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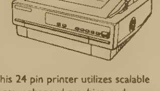

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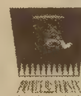

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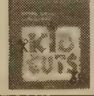

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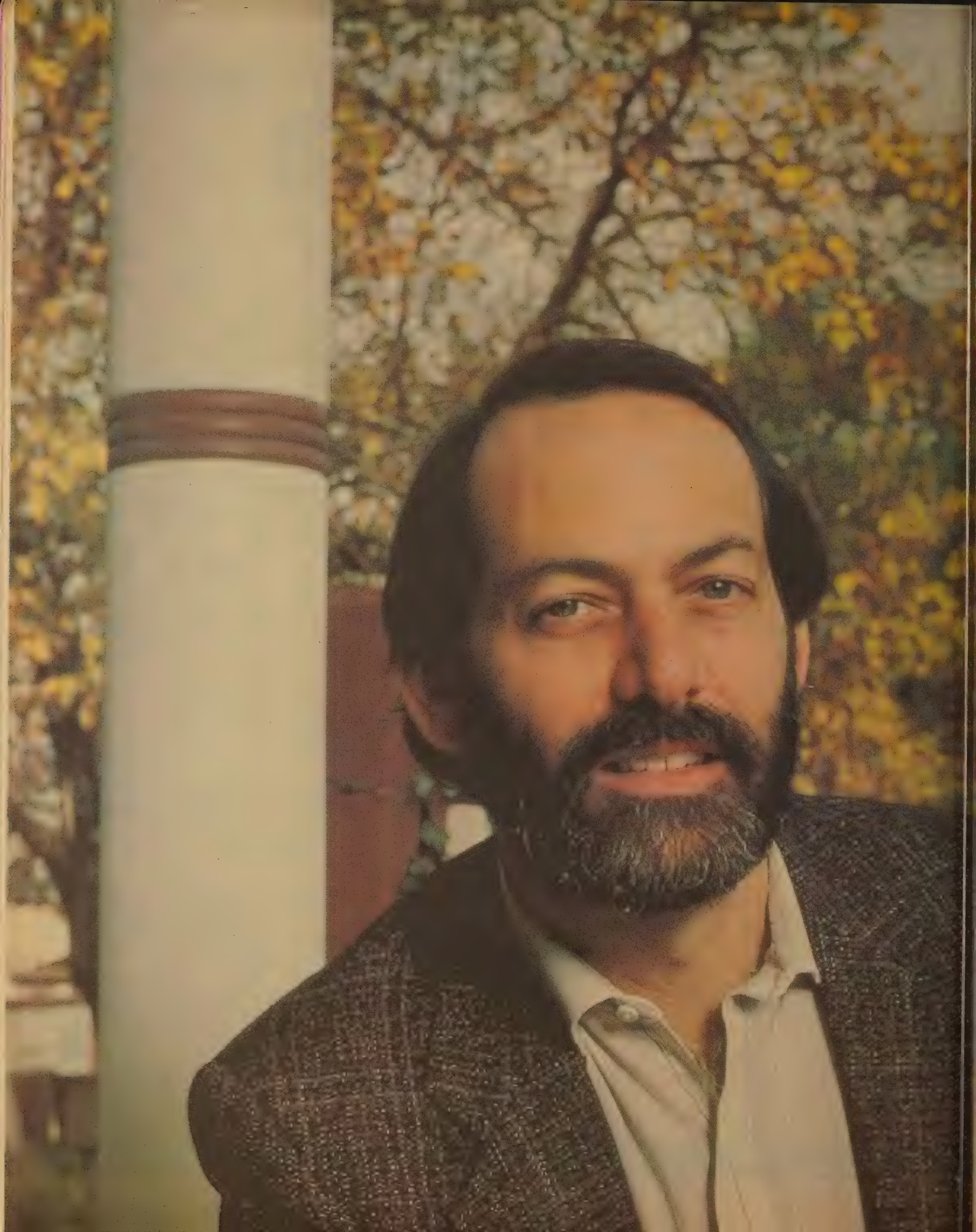

The New CPUs

And The Software That Runs On Them

An Interview With Microprocessor Report Publisher Michael Slater

By Mary Eisenhart

Photo: Michael Jay

Today's platform wars may cause many of today's computer users to wonder, idly or otherwise, whether their next machine will be based on Pentium or some RISC chip, and system administrators to fret over what virtual corners they'll paint themselves into by going with Windows or System 7 or OS/2 or any of dozens of UNIX dialects.

For the people who design the products these customers use, in-depth understanding of the technical subtleties of hardware and software is indispensable. Programmers need to know every possible nuance and quasi-documented feature of the chip they're writing for; competitors need analysis of what their rivals are up to; designers of specialized chips and boards need to make their products work with those of other vendors.

Founded in 1987, Michael Slater's *Microprocessor Report* newsletter has become a vital resource to the technical community. His company, MicroDesign Resources, now produces the six-year-old Microprocessor Forum conference, the new Microsystems Forum conference, and another newsletter, *Microsystems Insider,* that debuted in October. Also due soon is a series of studies, which Slater compares to market research reports with a crucial difference: "Our focus will be the opposite of the traditional market research reports. The typical market research report has a very cursory, usually not very accurate, coverage of the technology and the products, and lots and lots of depth on what the markets are and how big they expect the markets to be. We're going to be just the opposite."

Seeking insight on the matter of where it's all going and how to plan for it, we recently paid Slater a visit in his rural office in Sebastopol. (MicroDesign Resources, 707/824-4004, 1-800-527-0288).

All the products we know and love are coming to the end of their life cycles—people are trying to figure out whether to go with Pentium or PowerPC or Sparc or MIPS or whatever.

What do you think are the issues that are going to drive this? Is Intel going to own the world forever? If so, why? If not, why not?

That's a big question.

There's always a tradeoff in any technology decision between doing the most effective, efficient, innovative thing, and maintaining compatibility with what you've done before. Every time somebody does a new design, they have to weigh the benefit of compatibility versus the benefit of not worrying about compatibility.

The RISC architectures came from mostly academic design groups who, unlike the commercial microprocessor companies, were willing to say, "We don't care about the installed base. We don't care about compatibility with anything that exists. We're going to be pure." And as a result they came up with a new architectural style that was a better match for the state of technology at that point in time. Instead of being something that was five layers of incremental improvements on something that was fifteen years old, it was, "Okay, reset, start from scratch. Design something brand new on the assumption that you've got hundreds of thousands of transistors per chip, that you're going to have a 32-bit architecture, that you're going to have all your software written in a high-level language."

This is a whole different set of assumptions than when the x86 and 68000 architectures were designed, when you had ten or twenty or thirty thousand transistors per chip, lots of software was written in assembly language, processors were not highly pipelined, and clock rates were lower. It was just a whole different technology environment.

That's how the RISCs came about, and they are still facing the challenge of how to get an acceptable software base, having made that break. The advantage, obviously, of just moving ahead with the x86 architecture is that you get to carry along all the old software.

And the disadvantage is that you have to carry along all the old software...

Right. And that you have to live within the constraints that that imposes.

Certainly if we look for other examples in the history of technology to try and come up with precedents for this, the typewriter provides a very compelling case for Intel. Because for I don't know how many decades, but a long time, people have known that there's a much better keyboard layout than the one we all use, but the advantages of compatibility have outweighed the benefit of having the more efficient layout.

I think that's what Intel hopes will keep the x86 architecture alive forever, and it obviously depends on how high the price is that you pay for sticking with the old stuff. What's the price of compatibility and what's the threshold of pain in going away from that easy, compatible environment?

In the x86 world, there is now a lot of choice of vendor—you can decide whether to buy a Cyrix processor, an AMD processor, an Intel processor; you can decide whether to buy a 486 system or a Pentium system. In some sense, none of those choices are important, because no matter what choice you make, it all runs the same software. Really the only question is price/performance.

They all run the same software; the machine's going to do the same thing; and the only question there is, "Am I going to get enough performance to be worth the extra price of going to this other product, or am I going to be burned in some way if I save the money and buy this off-brand product?" But it's really not, in a fundamental sense, a very important decision. No matter what you do, you're going to end up with something that's probably acceptable.

There's always a trade-off in any technology decision between doing the most effective, efficient, innovative thing, and maintaining compatibility with what you've done before.

As soon as you look at going to one of the RISC architectures, like MIPS or Alpha or Sparc, you're now looking at a whole new software environment, so that is a much, much more difficult decision to make. You also get more benefit from doing it, if it works for you, in that you get out of all the technology baggage that the x86 carries with it.

The RISC processors do provide significantly higher performance at about the same price, at least at the chip level. Or you can get chips at about the same performance at significantly lower prices, for RISCs as compared to x86. One of the reasons they haven't taken off as much as some people had hoped is that the advantage in chip price has not been translated to an advantage in system price, in many cases, because the companies building the RISC systems have generally operated at much higher profit margins than the PC industry, which operates at astonishingly thin margins. If you have one company living on a 10% profit margin and another company living on a 30% profit margin, that difference will completely obliterate any advantage that the RISC processors have, if the RISC guys are living on those high margins.

There's also the fact that UNIX software, as contrasted to PC or Mac software, can be priced almost an order of magnitude higher for the same application, because they're not used to dealing in volume. This is one of the big barriers, I think, for people who might like to migrate to, say, SGI, but are horrified at what the same software they're currently using would cost.

The UNIX world has a whole series of problems that have kept it from ever becoming a real player in the real PC business. One, as you mentioned, is that applications tend to cost much more for basically the same application, because it tends to be more support intensive, and they're selling into a smaller market so they need to amortize their development cost over a smaller number of units.

Also, just the complexity of using and administering UNIX has been an enormous barrier, and there is also the fact that there hasn't been *a* UNIX, but dozens of UNIXes, each of which required a different version of the application software.

Maybe that's getting fixed now, but I think it's too late for UNIX to become a high-volume product. The chances for UNIX to ship millions of units a year have ended.

The operating system that is giving the RISCs an opportunity to play in the PC space is Windows NT, which has a couple of key advantages over UNIX. One is that it provides compatibility with the Windows applications, which is the applications that people want to run today. It's provided by Microsoft, and Microsoft is the company that has relationships with every single maker of PCs, that probably has on its mailing list every single user of PCs, and that has relationships with every software distribution channel in the PC market. They've got an enormous ability to move that product, if they decide to do that, and if it meets people's needs.

If we look for other examples in the history of technology, the typewriter provides a compelling case for Intel. For a long time, people have known that there's a better keyboard layout than the one we all use, but the advantages of compatibility have outweighed the benefit of the more efficient layout.

For the RISCs getting into the PC market in the near term, they've got a couple of enormous, and, I think, insurmountable, problems, as far as getting to high volume. One is that they don't run Windows 3, they run Windows NT. For someone to use a RISC system, they first have to decide that they want to run Windows NT. I think it's going to be a very small number of people that decide they want Windows NT on any architecture.

It's big, and it's as complex as UNIX...

Well, it's probably not as complex to administer as UNIX, but it needs at least 16MB of memory, probably 20 to 32MB of memory in a reasonable configuration. It needs probably at least 70MB of disk space for just the system files and maybe an application or two. You're looking at probably a couple of hundred megabyte disk drive, minimum.

So your low-end entry-level PC is not going to run it adequately, and you're going to need a top-of-the-line 486 to get adequate performance on it. And yes, it will run your Windows 3 applications, but they'll run a little slower than they ran on Windows 3, so why would you want to make this change?

Well, you might want to make it because you like the idea of having something that provides preemptive multitasking, and multithreaded applications. Even though a lot of users probably don't understand what either of those things mean, what they *will* understand is that they would like the system not to crash entirely when one application fails, and memory protection in Windows NT will buy them that. They would like to have the foreground program continue to run smoothly while they have things going on in the background—being able to have a high-speed modem transfer going on in the background, and printing in the background, and still have your mouse movement be smooth and your word processor not stutter as you type characters, that's what preemptive multitasking will do for you.

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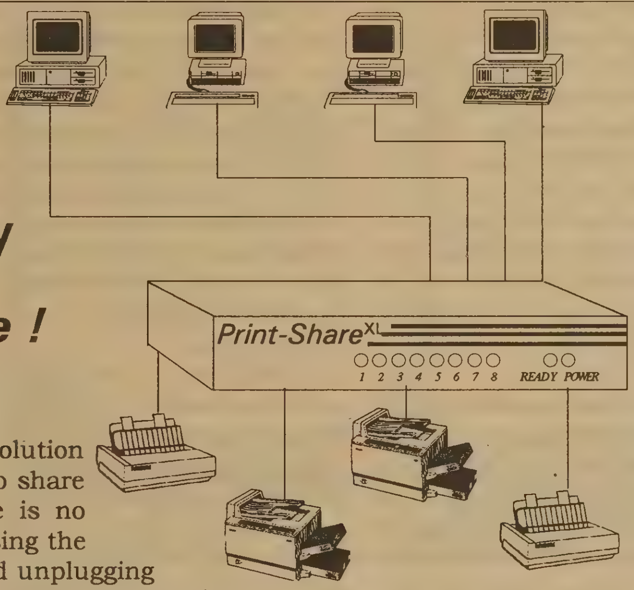

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your system essentially locked while it prints to the print spooler, the print job gets spawned as a background task; writing to the print spooler is done as a background thread while the foreground continues to work.

A lot of what people will see is that the foreground task continues to work, no matter what's going on in the background. These seem like obscure technical advantages, but they ultimately will deliver real simple benefits that everybody will appreciate.

But, are you willing to buy a new operating system, buy another 16MB of RAM, in order to get those benefits? Well, you might be if it was the only way to do it. But the thing that is really going to stunt the growth of Windows NT is Microsoft's own alternative, the product they talk about as Chicago, which will be called Windows 4, I suspect, when it's announced.

Certainly Microsoft is, through its own products, severely restricting the Windows NT market, but this is something they understand very well. It's not something they're doing by accident.

It's important for Microsoft to have a product to upgrade the installed base, and Windows NT is not an acceptable installed-base upgrade. Moving your base system from 4 to 16MB is not an acceptable upgrade.

And they've got this x86 software base out there that doesn't really care about portability. If you have a 486 system and you want an upgrade, you don't really care if that upgrade operating system will run on other microprocessors. And some of the other things that Windows NT has, like C2 level security, or support for multiple processors, just aren't going to matter to very many people.

So Chicago is really a better solution. Or I should say, what Chicago has promised to be promises to be a better solution. It's at least a year away, probably, from shipping to users.

But Chicago is there on the horizon, and will give users an upgrade that will give them preemptive multitasking, and will give them memory protection, and will give them multithreaded application support and 32-bit addressing—all the good things about Windows NT except for security and multiprocessor support and portability to other architectures. It's simply a much more effective upgrade for most users, and for new system purchasers it's going to be a better alternative.

Basically, Windows NT is only applicable to those people who either don't want to wait for Chicago—they want something now that will give them preemptive multitasking and multithreading and so forth—or for whom things like multiprocessor support or the few things that Windows NT gives them that Chicago doesn't are valuable. For a large company building a corporate mission-critical system, the fact that it has C2 level security may be enough to say, "We're willing to pay for 16MB of RAM. Plus we want to start building it now, we don't want to wait a year till Chicago maybe comes out."

The operating system that is giving the RISCs an opportunity to play in the PC space is Windows NT, which has a couple of key advantages over UNIX.

Chicago is Intel-specific, right?

Chicago is Intel-specific. It's still full of assembly language. It's not written in a high-level language.

I think the NT market is going to be a couple percent of the PC market. I think a wild success scenario for NT at this point would be 5 or 10%—ten percent's probably almost inconceivable. And of that small piece of the PC market, most of the people that run NT are probably going to run it on a Pentium machine, maybe a 486DX2. It's a small piece of that relatively small Windows NT market that's going to want to buy a RISC machine, and that piece is going to be divided among several different RISC architectures, so the size of the market for each of those RISC architectures on Windows NT is not going to be millions of units.

It could still be a significant opportunity within the scale of the volumes they're at today. MIPS-based systems are on the order of eighty thousand units this year; 486 systems are at about forty million units this year. It's a fraction of 1%. A tiny little sliver out of the PC market could double and triple and quadruple MIPS's volume. Yes, there are significant opportunities there for MIPS. No, it's not going to cannibalize a major piece of Intel's business in the near term.

Now the scenario that could lead to more shift is, over the next several years, the RISC processor vendors get more and more peripheral chips and support chips developed; they get a couple of PC vendors building the systems; they get all the infrastructure in place so that people can build RISC-based systems as easily as people build x86-based systems today. Software developers more and more are writing everything in high-level languages—gradually they'll probably pay attention to porting to another architecture, just because it's an opportunity that's there that they probably shouldn't ignore forever. And memory gets cheaper and cheaper, so in, say, 1996, 16MB is probably an entry-level system.

As long as Windows NT doesn't keep increasing its appetite faster than memory prices go down, there should come a point somewhere in the second half of the decade where the additional resource requirements of NT are not a problem, and where software developers are starting to routinely provide portable versions of their software on different architectures, and all the hardware infrastructure will be there.

So I think these next few years are not really a chance for the RISC architectures to become high-volume platforms that will take major pieces of the Intel market, but there is an opportunity for them to build the infrastructure, build the support, so that later in the decade they might be able to find an opportunity to get a wedge and actually get a higher-volume piece of the market. It won't be with Windows NT per se, but with Cairo, which is the next-generation follow-on to NT.

The thing that is really going to stunt the growth of Windows NT is Microsoft's own alternative, the product they talk about as Chicago, which will be called Windows 4, I suspect, when it's announced.

From an OEM or user standpoint, what are the weaknesses in Pentium that another vendor might want to exploit?

It's pretty much just an issue of price/performance.

The clichés are that it's hot, it uses too much power, it takes too much silicon wafer to build...

But those same problems apply to most of the RISC processors. Alpha takes substantially more power than Pentium. The high-end MIPS parts, the R4400s, are right in the same ballpark.

The concerns about Pentium using so much power were really not Intel's problem, they were the PC industry's problem. It was the problem of an industry that, for the most part, had little to no engineering capability, and basically just bought chips, stuck them on boards, put them in boxes, and stuck a fan in the back. You can get away without doing any real thermal design when you've got parts that are using 2 and 3 and 4 watts; when you try to take a 12- or 15-watt chip and stick it into that same basic mechanical design, it overheats. You simply need more cooling, and that's just a fact of life; the PC makers just needed to get more sophisticated about the sort of cooling they provided.

If you put aside for a moment the enormous software handicaps that they're faced with, the advantage the RISCs have, from a technical point of view, is that they are more efficient in terms of the number of transistors it takes to build a chip to achieve a certain level of performance. If you look at the low-cost MIPS chip—like the 4200, a low-cost version of the R4000—it provides about the same performance as Pentium and is cheaper than a 486DX. It's actually about the same die size as the 486DX; it uses about the same amount of silicon. The Alpha chips are not as small or as cheap as that, but some of the Alpha chips are significantly faster than Pentium in terms of performance, but at roughly the same price and die size and power consumption.

So all else being equal, the RISC chips will either deliver higher performance at the same price, or comparable performance at a significantly lower price, because they do have that fundamental technical advantage.

In terms of price, it's probably better than a two to one advantage today. You can get Pentium-level performance out of, say, a PowerPC chip, or a MIPS 4200, for less than the price of a 4860X2.

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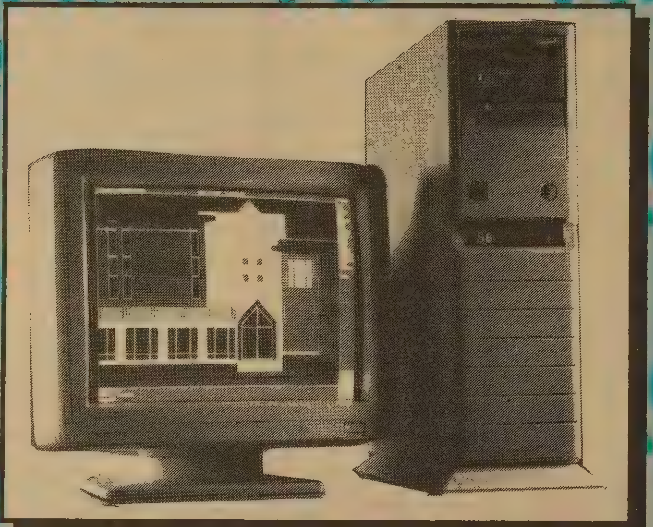

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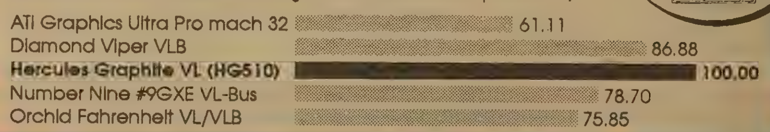

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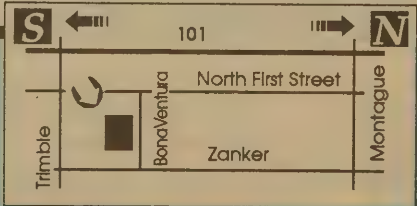

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how it fits into the scheme of things. We're only starting to see product...

Well, that ties us back into 68000s and Motorola and Apple.

PowerPC will have its initial significance as the inheritor of the Macintosh installed base, assuming that Apple pulls off this transition. Apple is at an incredibly delicate point in its evolution here. If they bungle this transition, people are going to switch to Windows en masse. It could be catastrophic for Apple if they don't make that a smooth transition.

But on the other hand, if they are able to pull off this transition in a reasonably smooth fashion, it should enable them to provide significantly faster machines than the x86-based PCs at comparable price points. It would be really the first time in the history of Apple where they would have a raw price-performance advantage. They have succeeded so far not because of a price-performance advantage, but in spite of *not* having a price-performance advantage. They could do that when they had such an enormous advantage in software, but now that their advantage in software has been whittled away, they need to get to a point where they've got some hardware advantage. PowerPC could give them that.

The initial PowerPC chip, the 601, does sell for about the price of a 486DX and delivers substantially better than Pentium performance, especially on floating point applications, although floating point is less important to most users. But for a CAD user, for example, the advantages are quite large.

Could you explain about the significance of floating point?

It's a tough one to explain without getting into a really technical discussion, but basically integer code is dealing with regular old whole numbers, or fractions, whereas floating point code represents numbers as a mantissa and an exponent. It's just like scientific notation, where instead of saying "The number is thirty-seven billion," and having to have an integer the size of thirty-seven billion, you say, "I want a 37, and put this many zeros after it."

It's a two-part way of representing numbers that lets you get a vastly greater range, from very, very small numbers that you can still maintain with high precision, to very, very large numbers.

The penalty is that doing arithmetic on integers is a relatively simple thing to do, from a hardware point of view. The number of transistors it takes to build a circuit that will add together two integers very quickly is much, much smaller than what it takes to add two floating point numbers very quickly. With floating point numbers, you have to first normalize them so that they both have the same exponent, and then you have to add the mantissas, and then you have to renormalize—it's a multistep, relatively complex process.

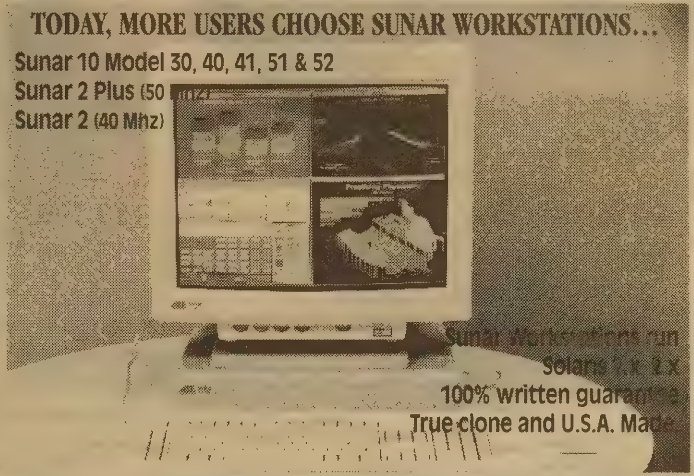
PowerPC will have its initial significance as the inheritor of the Macintosh installed base, assuming that Apple pulls off this transition. . . . if they bungle it, people are going to switch to Windows en masse.

There are lots of tradeoffs in building hardware to do floating point. You can build hardware to do floating point math in relatively few transistors by allowing it to be quite slow and doing it as an iterative multiple step process. If you want to make it as fast as integer arithmetic, then it takes relatively large numbers of transistors.

Intel did not devote those transistors to making floating point fast in the 386 and 486 implementations. In Pentium they did throw a lot of transistors at it, and they actually have a raw floating point engine in the Pentium chip that is comparable to most of the RISC floating point engines. But there are some fundamental weaknesses of the floating point architecture of the x86. It does not have a general-purpose register file; instead it has this stack of registers, that is a far less efficient way to access the working memory being used by the floating point processor.

Pentium has vastly better floating point performance than the 486 did, but even with Pentium, it's way behind the fastest RISC processors in terms of floating point.

In terms of how this shows up to users, most users don't use applications where floating point performance is very important. Things like word processors and databases gen-



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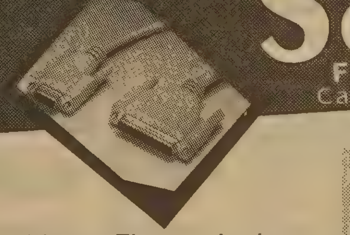

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erally use no floating point at all. Spreadsheets may or may not use floating point; trigonometric functions are generally done in floating point, so if you have a spreadsheets that's doing sines and cosines and things like that, that might need floating point. Some other functions in spreadsheets might be done in floating point. But even normal-sized business sorts of spreadsheets are not going to spend a huge percentage of their time doing floating point calculations.

Two-dimensional drawing programs often don't use any floating point. If floating point were available and inexpensive, those programs probably would have used it. But in fact, those programs have been written for the PC environment, where floating point was not something you could assume everybody had, so they avoided using it.

Now 3-D graphics is a case where you just need floating point, so 3-D graphics programs are very sensitive to floating point performance. This is why machines like the Silicon Graphics boxes and all the RISC workstations have had much, much better 3-D graphics performance than PCs. They also have much better graphics hardware, which is part of it, but part of it is also having processors that simply have much better floating point performance.

Lots of scientific simulations use lots of floating point. If you're trying to model the weather patterns of the world, or nuclear explosions, then floating point matters a lot.

If Apple can pull off this transition, it should enable them to provide significantly faster machines than the x86-based PCs at comparable prices. It would be the first time in the history of Apple that they would have a raw price-performance advantage.

I was at this Autodesk conference the other day, and Carol Bartz was saying that CAD and 3-D design and all this stuff which is considered a niche nowadays is about to be a lot more mainstream than it was. If so, is this going to drive a migration from one platform to another? For example, are all the people that have been running AutoCAD on 486es suddenly going to move to Suns or SGIs or PowerPCs? And is multimedia going to make a difference?

Multimedia is a complex issue, and the RISC architectures may have some advantage there, but I think there are vastly greater issues of system architecture and software design and support chips and user demand, that are all probably more important than the processor architecture.

But as applications get more sophisticated and as they move into more 3-D-modeling sorts of tasks that do use floating point, the performance advantage of the RISCs does increase. It gets back to this tradeoff of, if I move away from the x86 architecture, I have to put up with some degree of pain, because I now have to replace my applications, and there are fewer applications available, and so forth. I get some payback for that pain, which is a boost in performance. The more floating point my application uses, the more payback I'm going to get.

The classic candidate for a RISC Windows NT machine today would be not a mainstream user who all of a sudden somehow finds 3-D modeling attractive, but the classic AutoCAD sort of user who spends 90% of his workday using AutoCAD. He probably doesn't care very much about other applications, and AutoCAD probably will be ported onto all these architectures.

There is a class of users that predominantly uses a few applications, where performance is really critical on those applications, where that person's work productivity would be significantly enhanced if those applications ran faster. The companies that develop those applications are the companies that are going to port to all the RISC architectures, because they know their users are looking for maximum performance. And the users of those applications are the kind of people that are likely to want to buy a machine, because it is much faster even if it only runs a small fraction of the software base.

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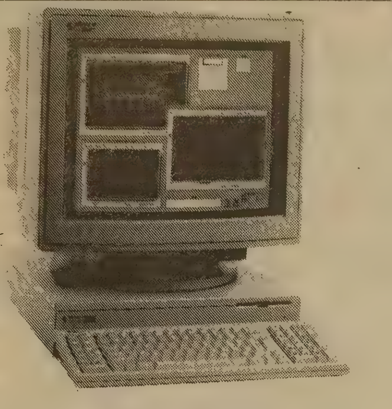

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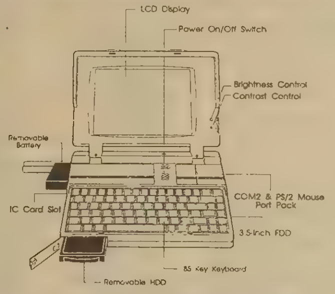

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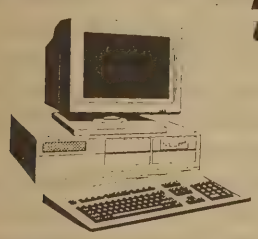

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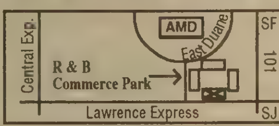

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Their ability to get beyond that is going to depend upon operating systems beyond Apple.

That is to say, also beyond Taligent and Kaleida and all that?

Yeah. Who knows what will come out of Taligent, but I have a hard time finding anybody these days who thinks that it's going to be a high-volume product. Few people seem to view Taligent as a next-generation replacement for anything that exists. It's a new thing that will establish a niche, but it's a niche product, not the next-generation mainstream replacement.

Apple missed an incredible opportunity. I think it's one of the worst business decisions in the history of the PC business not to license the System 7 software to other hardware manufacturers. If they had done that—

It's *so* much better than Windows...

Well, actually, you know, the thing is it's not any more. We're a Mac shop at our office, but Windows has gotten a lot better, and System 7 hasn't gotten a lot better. Chicago is going to blow away System 7 unless System 7 gets dramatically better. I hope it does.

But my point was that if, before Windows 3 shipped, Apple had licensed System 7, System 7 would be the dominant graphical user interface and the dominant operating system in computers today. Because they didn't do that, Windows has really taken over. It has so much more momentum than the Macintosh market, and so much more development effort behind it, that I think at this point even if they were to license it, it would have relatively little effect.

And they are still saying that they have not made a decision to license System 7 on PowerPC. They're allowing other companies to build UNIX systems that also have System 7 application compatibility, but you can't just build a System 7-on-PowerPC system, as Apple will for its own PowerPC Macintoshes. So it remains essentially a proprietary platform.

The classic candidate for a RISC Windows NT machine would be not a mainstream user who all of a sudden finds 3-D modeling attractive, but the user who spends 90% of his workday using AutoCAD.

Companies like Motorola and IBM which are trying to sell chips are looking for ways to have a larger piece of the business than Apple is going to be able to capture for the PowerPC processors, so they are clearly very interested in Windows NT. There has not been any formal acknowledgment that they're doing a PowerPC port of Windows NT, but it's been very widely rumored, and I'm convinced that it is happening and they're just not ready to talk about it quite officially.

I think one of the reasons that there have been so many rumors is that at the same time they don't want to talk about it, they probably are happy for everybody to know.

Motorola, I sense, does have a very deep commitment to PowerPC, as their long-term opportunity to become a player in the PC market. I get the feeling that they do understand that this is not a one- or two- or three-year plan; this is a five- or ten-year plan. It's "What can we do so that eventually there is a chance that the x86 architecture doesn't dominate the PC business?" They're making a very significant investment, and I think are going to have the patience to wait it out for several years for that market to grow.

I think they've got a significant chance to be the leading player as we get to this next transition I'm talking about—not this transition from Windows to Windows NT or Windows to Chicago, the next one. It's after everyone's upgrading from Chicago to the next thing, and from Pentium to whatever's after Pentium, and from all of today's RISC processors to the next batch of RISC processors, probably the same architectures but a different set of implementations. It's that transition, in the 1996–97 sort of time frame, where I think there might be an opportunity, somewhere along that way, for Motorola to make a real hard push with PowerPC and establish it as a higher-volume standard.

If over these next few years they can find a niche for it and build the infrastructure and get the software ported, it's not going to be millions of units overnight, but it could be millions of units eventually. They'll have Apple's volume and IBM's backing to give them revenue to fund continued development without being dependent on the PC market to generate that revenue. And they also have the wild card of IBM's personal computer operation, where if IBM decided to push PowerPC-based systems running Windows NT, they would have certainly the ability to make a significant dent in the marketplace.

The advantages of the RISCs are going to be the greatest in the things that are doing floating point, which would be primarily 3-D graphics and simulations and modeling and things like that. Three-D graphics is something that people have viewed as sort of an exotic application, but if you could buy an inexpensive machine that had good 3-D graphics performance, then all this sort of virtual reality stuff, being able to sketch out a design for your house and then do a 3-D walkthrough—there are plenty of accessible consumer-like applications that would be made possible by high-performance 3-D graphics.

And in that area, PowerPC or another RISC chip would have a bigger advantage over the Intel architecture.

Now I think all this is not lost on Intel. Clearly in their public positioning they can't say anything but "x86 forever," right?

Intel certainly has the technical ability to do a RISC architecture and implementation that would rival anything that's out there today. The question is how they fit it into their business strategy.

Although at one point a few years back they were doing RISC development and making a fair amount of noise about it.

Well, they did two RISC architectures. They did the 960, which they decided to focus on embedded applications so as not to confuse the market by competing with the 386, and they did the 860, which was really conceived as a floating point accelerator to work alongside an x86 microprocessor. There was an ill-conceived decision to try and push it as a UNIX engine, for which it was exceptionally poorly suited and therefore failed. It was also late to the market.

But Intel certainly has the technical ability to do a RISC architecture and implementation that would rival anything that's out there today. The question is how they fit it into their business strategy. If they were to just invent a new RISC architecture and say, "Here's our new RISC chip," they would have no built-in advantage over all the other RISC competitors and be too late to the market to play that angle.

So my favorite scenario for something I think they could do over a period of time would be to introduce essentially a new mode. You can think of it as building a dual-mode chip that would be a RISC processor that would also have an x86 emulation mode. But it would have a real RISC processor at its core. Whereas people sort of talk about the Pentium as being that, but it's not. There is no RISC core that you can find anywhere in Pentium. It uses a lot of the same techniques that the RISC chips use, but the complexity of the x86 instruction set pervades the chip.

But you could build a processor that had a real RISC streamlined core, fixed length instructions, all the good things that make RISC more efficient, and then have some sort of translation engine on the side, for x86 code. In theory, if you had such a processor you could sell it as an x86 processor. It would not be as cost-effective as a pure x86 processor, but Intel might, for example, choose to accept very low profit margins on that part to establish it in the marketplace. They certainly have enough cash to do that—they're sitting on more than three billion dollars in the bank currently.

They could have a Trojan Horse scenario, where this RISC architecture sneaks into the marketplace because everybody buys these chips just as x86 chips and runs their x86 software on them. And one day Intel starts telling software developers, "Gee, there's actually millions of these things out there, so if you recompile your code for this new

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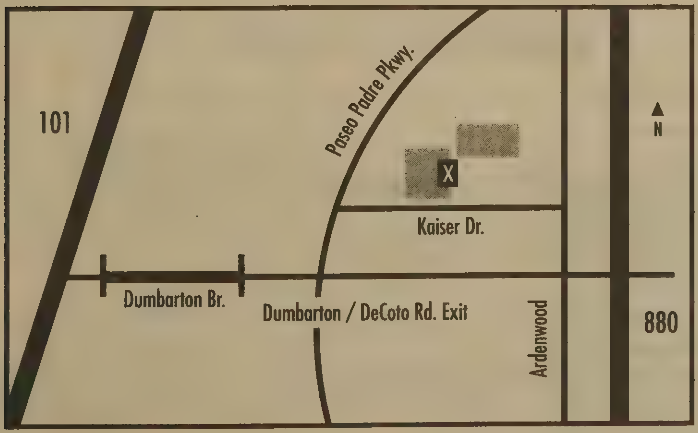
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architecture, and set this bit that causes the processor to flip into this new architecture mode, then you can take advantage of this new architecture." And then eventually a few years later, if all the software developers have done that, the high-end processors can start dropping the x86 support hardware. And at that point, Intel has made an evolution to a pure RISC architecture.

I think it's a conceivable scenario. I certainly don't pretend to know what Intel's actually doing. There are a million practical details that must be dealt with. So it's more of a thought experiment than a business plan, but something like that could enable Intel to gradually move away from the limitations of the x86 architecture, though they would argue today, at least publicly, that it's just not necessary; that the limitations of the architecture are real—at least the honest people there will admit that they're real—but that they're not so great as to ever cause them to lose significant market share.

Being 30–50% slower than the fastest RISC processor is not going to be enough to get people to put up with an enormous software transition. The vast majority of the market is a few years behind the leading edge of performance, so the fact that your leading edge is a year behind the other guy's leading edge just doesn't make very much difference.

Being 30–50% slower than the fastest RISC processor is not going to be enough to get people to put up with an enormous software transition. The vast majority of the market is not at the leading edge of performance. The vast majority of the market is a few years behind the leading edge of performance, so the fact that Intel's leading edge is a year behind the other guy's leading edge just doesn't make very much difference.

How important do you think it is that all these operating systems—Solaris and Nextstep, not to mention NT—are portable and non-CPU-specific?

I think it's just a matter of developers saying "Let's do a reasonable thing with the technology that exists." Software is tied to CPUs not because anybody wanted it to be that way, but because to get acceptable performance you had to write in assembly language. As processors have gotten faster, and compilers have evolved, and programming styles have changed, there has been an almost complete shift to writing in high-level languages.

Once you're writing in a high-level language, if you just pay a moderate amount of attention to portability concerns, your software is portable. So given that there is all this tumult going on, clearly it would be a foolish thing to make any major software investment in something that wasn't portable. Why lock yourself in?

You could make a reasonably compelling argument today that says if you're only concerned about the reasonably near term, locking yourself into the x86, if you're focused on the high-volume market, might be a reasonable thing to do. But locking yourself into any other architecture would clearly be foolish, and locking yourself into the x86 architecture would be foolish if you cared about the leading performance edge.

Looking at non-CPU chips for a moment, what do you think are some of the interesting applications and opportunities?

There are a lot of them. I think in ten years the majority of high-performance processors will not be in things perceived as general purpose computers. Even today, the vast majority of processors are not in computers.

The biggest computer market is the 486 market, which is around forty million units a year. Embedded processors sell well over a billion units a year, but they're at an average price of probably a dollar or two. They're typically very cheap, very small, relatively

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- 8 Bit Digital sampling & playback
- Includes Lemmings, Indianapolis 500, Multimedia Encyclopedia

Sound Blaster 16 ASP $209
- 16 Bit Stereo sampling & playback
- Includes HSC InterActive, PC Animal Plus, Multimedia Encyclopedia

Spectrum 16 Multimedia Sound Card $155
- SCSI or AT Interface

CD-ROMS

Mitsumi MPC CD-ROM $165
- AT Bus 350ms access time, 150KB transfer rate

SONY CDU31A $165
- AT Bus 430ms access time, 150KB transfer rate

Texel DM-3024N $325
- SCSI, 265ms access time

Toshiba XM-3401 .... $365
- SCSI w/200ms, 330KB transfer rate

CREATIVE LABS UPGRADE KITS

Edutainment CD 8 Bit $445
- Sound Blaster Pro Deluxe
- Speakers
- Creative CD-ROM
- 8 software included

Edutainment CD 16 Bit $485
- Sound Blaster 16
- Speakers
- CD-ROM
- 8 software included

Discovery CD 8 Bit $370
- Sound Blaster Pro Deluxe
- Speakers
- Creative CD-ROM
- 4 software included

Discovery CD 16 Bit $430
- Sound Blaster Pro Deluxe
- Speakers
- Creative CD-ROM
- 4 software included

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486SLC2-50MHz

- IBM 486SLC2 CPU w/16K Cache
- Motherboard manufactured in the USA by IBM
- 1 MB RAM expandable to 16MB
- 1.2 or 1.44MB Floppy Drive
- 1.1 Interleave HD/FD Controller
- Tower or Desktop Case w/power supply
- 101 Enhanced Keyboard

486SLC2-50MHz VESA w/64K Cache	$410
486SLC2-66MHz VESA w/64K Cache	$460

486-40MHz w/64K Cache

w/AMD 486-40MHz CPU	$470
w/Cyrix CPU, Math Chip	$345

- 1MB RAM Expandable to 32 MB
- 1.2 or 1.44MB Floppy Drive
- 1:1 Interleave HD/FD Controller
- Tower or Desktop Case
- 101 Enhanced Keyboard

$270
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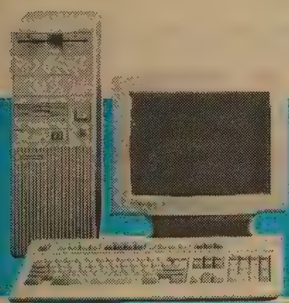
- 1MB Expandable to 32MB on Board
- 64K Static Cache Memory
- Shadow RAM
- 1.2 or 1.44MB Floppy Drive
- 1:1 Interleave HD/FD Controller
- Socket for 80387
- Tower or Desktop case w/power supply
- 101 Enhanced Keyboard

$240
386SX-33MHz

- 1MB Expandable to 16MB on Board
- Shadow RAM
- 1.2 or 1.44MB Floppy Drive
- 1.1 Interleave HD/FD Controller
- Tower or Desktop case w/power supply
- 101 Enhanced Keyboard



65MB 15MS	$155	212MB 14MS	$200
125MB 15MS	$165	250MB 15MS	$225
170MB 15MS	$180	340MB 14MS	$265
		510MB 12MS	$450

Keyboards

Mitsumi 101 Key	$39
Keytronic 101 Key	45
Maxiswitch 101 Key	45

Floppy Drives

TEAC/Epson 1.2MB	$55
TEAC/Epson 1.44MB 3.5"	55

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Conner 3000 40MB	$130
Conner 85MB	170
Conner 30104 120MB	180
Maxtor 7120A 130MB 15ms	180
Conner 170MB	190
Western Digital 210MB	215
Maxtor 210MB	215
Conner 250MB	235
Maxtor 340MB	290
Western Digital 340MB	290
Conner 3504 510MB 12ms	495
Fujitsu 512MB 12ms	575
Fujitsu 1.2GB SCSI	890

Modems

2400 Baud (Int)	$30
2400 Baud (Ext)	50
Fax Modem (9600 Fax, 2400 Modem)	50
14,400 Modem, 14,400 Fax	125

Interface Cards

Mono Graphic Card	$20
VGA Card (16 Bit 800x600)	30
OAK SVGA (1024x768 512K)	40
Trident VGA w/1M RAM	55
Orchid Fahrenheit (1280x1024) w/1MB VRAM	150
Orchid Fahrenheit VLB w/1MB	150
ATI Ultra Pro w/2MB VRAM VLB	330
Orchid P9000 VLB w/3MB	375
Diamond Viper w/2MB	375
AT M I/O (2S,1P,1G)	25
IDE Card w/cable	25
Promise IDE VESA Cache Controller	145
Adaptec SCSI 1542C w/Kit	245
Adaptec 1742 EISA SCSI	375

Monitors

14" Flat Screen	$95
Super VGA (1024x768) .39	205
Super VGA (1024x768) .28	245
Non-Interlaced SVGA Monitor	260
Sony 1304S/1430	535/575
Sony 1604/1730	920/975
Viewsonic 6	295
Viewsonic 7	820
Viewsonic 15	460
Viewsonic 17	1020
Viewsonic 8	1510
NEC 3FGE/4FGE/5FGE	590/690/1070

Motherboards

386SX-33MHz	$105
386-40MHz 64K Cache	155
486SX-25MHz	170
486-33MHz w/64K Cache	370
486-50MHz w/64K Cache	505
486DX2-66MHz w/64K Cache	570
IBM 486SLC2-50MHz	200
IBM 486SLC2-50MHz VESA	260
IBM 486SLC2-66MHz VESA	310

Miscellaneous

387SX	$60
387-25/33/40	65/75/85
150W (XT) Power Supply	40
230W Power Supply	48
Logitech Mouse Man	65
Logi Trackman	75
Microsoft Mouse OEM/retail version	40/85
DFI Mouse (3 Button, Microsoft Comp.)	15
Mini Vertical Case w/PS	55
Mid Mini Vertical Case w/PS	85
Full Vertical Case w/PS	110
Colorado 120MB Tape Backup	150
Colorado 250MB Tape Backup	165
16 Bit Ethernet Card	69
WD SMC Elite Ethernet 16 Bit	135
RAM DIP / SIPP/ SIMM	Call

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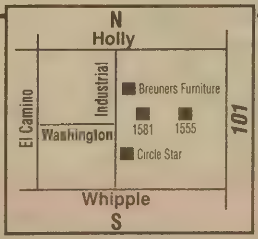

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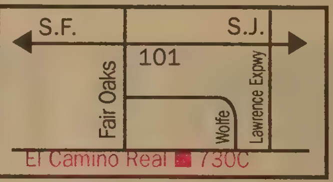

SC486DX VLB SUPER SYSTEM

- INTEL 486DX-33 MHz CPU
- 256K CACHE
- US MADE VLB SUPER BOARD
- 4 MB RAM
- 1.2 MB OR 1.44 MB FLOPPY DRIVE
- 101 KEYBOARD AND I/O CARD
- 213 MB HARD DISK
- VLB VIDEO ACCELERATOR
- IDE CONTROLLER
- 14" SVGA MONITOR .28MM
- MINI TOWER CASE W/230W POWER SUPPLY

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SC386DX-33/40 ISA SYSTEM

- INTEL/AMD CPU
- 128K CACHE
- 4 MB RAM
- 130 MB HARD DISK
- IDE CONTROLLER
- 1.2 MB OR 1.44 MB FLOPPY DRIVE
- 101 KEYBOARD AND I/O CARD
- SVGA ADAPTER WITH 512K
- 14" SVGA MONITOR 0.28MM
- MINI-TOWER CASE W/230W POWER SUPPLY

$888

MOTHERBOARDS

486 VLB 33/66 256KC w/o CPU	$130
386 DX 33/40 128KC w/CPU	119
486 SX 25 w/CPU 128KC	189
386SX 33 w/CPU	89

HARD DRIVES

130 MB IDE	$175
245 MB ID	239
340 MB IDE	339
520 MB IDE	649
1.2 GB SCSI	989

MONITORS

12/14" Mono	$95
14" SVGA 0.28mm	249
14" SVGA NI 0.28mm	289
15" 1280 NI	399
17" 1280 NI	699
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SVGA w/512K	$38
SVGA w/ 1 MB	59
Orchid F1280 VLB	169
Stealth 24 VLB	169
ATI Ultra Pro VLB	349

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1.2 MB 5.25"	$49
1.44 MB 5.25"	42
Teac 1.2 & 1.44 MB	129
Colorado 120 MB TB	125
Colorado 250 MB TB	175

DISK CONTROLLERS

IDE Controller	$15
IDE + I/O	22
IDE VLB + I/O	45
Adaptec 1542C Kit	245
Adaptec 2742C Kit	419
Ultrastor 34F VLB	299

KEYBOARDS

Mitsumi 101	$25
Lite-On 101	26
Keytronic 101	36
MaxiSwitch 101	38
Click 101	23
Focus 9000	75

CASES

Mini Tower w/230W	$55
Mini Desktop w/220W	57
Mid Tower w/250W	79
Full Tower w/250W	109
Full Tower w/300W	149

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2400 Internal	$36
24/96 Fax Internal	55
14.4/14.4 Fax Internal	149
14.4/14.4 Fax External	209

All w/Software For DOS & WIN.

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NE 2000 Comp. 16 Bit	59
SMC Elite 16 Bit	129
3COM	CALL
LANtastic AE-2 Starter	499
LANTastic AE-2 Adapter	199

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Mitsumi Int w/Card (Photo CD Ready)	$169
Sony CD-31 Int	169
Toshiba 3401B Int	399
Toshiba 3401B Ext	499
Spectrum 16 Sound Card	129

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Panasonic 2624	339
HP DeskJet 550C	589
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OKI Laser 400	CALL

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Microsoft Serial	49
Microsoft Bus	69
Logitech Trackball	79
Summasketch III 12x12	329
Calcomp	CALL
Kurta	CALL

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Complete PC GS Full Page	$325
ScanPlus Color Page	495

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MS-Excel	249
MS-Office	449

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4x9-70ns	CALL
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387DX-33	CALL
486DX-33	CALL
486DX-66	CALL

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SYSTEM	MainBoard +CPU	Basic System
586DX-60/256K VLB	$1900	$2042
486DX2-66/256K PCI	$755	$887
486DX-50/256K PCI	$712	$844
486DX-33/256K PCI	$566	$698
486DX2-66/128K VLB	$531	$663
486DX-50/128K VLB	$479	$611
486DX-40/128K VLB	$343	$475
486DX-33/128K VLB	$343	$475
486SLC2-66/64KVLB	$265	$400
486SLC2-50/64K VLB	$219	$350
486DLC-40/128K VLB	$141	$275
486DLC-33/128K VLB	$131	$264
486DX2-66/128K ISA	$521	$653
486DX-50/128K ISA	$469	$601
486DX-40/128K ISA	$332	$464
486DX-33/128K ISA	$332	$464
486DLC-40/64K ISA	$140	$272
486DLC-33/64K ISA	$124	$256
386DX-40/128K ISA	$102	$235
486DX2-66/256K NICE EISA VESA	$666	$798
486DX-50/256K NICE EISA VESA	$614	$746
486DX-33/256K NICE EISA VESA	$478	$610

SPECIAL BASIC

- * Motherboard w/CPU+4MB RAM 70ns
- * 1.2 and 1.44MB FDD
- * IDE 2FD/2HD Controller
- * AT I/O 2S/1P/1G
- * 120MB Hard Drive
- * 1024x768 .28DP 14" SVGA Monitor
- * 512K SVGA Card
- * 101 Enhanced Keyboard
- * Enhanced Case w/230 Watt Power Supply
- * Microsoft Compatible Mouse+ Mouse Pad

586 DX-60/256K VESA LOCAL BUS	$2660
486DX2-66/256K PCI	1472
486DX2-50/256K PCI	1429
486DX2-33/256K PCI	1283
486 DX2-66/128K VESA LOCAL BUS	1230
486 DX-50/128K VESA LOCAL BUS	1185
486 DX-40/128K VESA LOCAL BUS	1034
486 DX-33/128K VESA LOCAL BUS	1050
486 DLC-40/128K VESA LOCAL BUS	857
486 DLC-33/128K VESA LOCAL BUS	847
486 SLC2-66/64K VESA LOCAL BUS	978
486 SLC2-50/64K VESA LOCAL BUS	931
486 DX2-66/128K ISA	1220
486 DX-50/128K ISA	1174
486 DX-40/128K ISA	1024
486 DX-33/128K ISA	1030
486 DLC 40/64K ISA	840
486 DLC-33/64K ISA	833
386 40/128K ISA	812
486 DX2-66/256K NICE EISA VESA	1370
486 DX-50/256K NICE EISA VESA	1319
486 DX-33/256K NICE EISE VESA	1184

BEST BUY SYSTEM

486 DX2-66 /128K INTEL VLB MB w/CPU
+8MB RAM
+1.2&1.4 FD
+340MB HD
+SPIDER VLB 1MB
+Viewsonic 6E
+ IDE VLB+ mini case
+Focus 2001 keyboard

$1600

OPTIONS

	ADD
-Non-Int Monitor	$15
Viewsonic 6E Monitor	65
-KFC 15" Non-Int	160
-PCI Graphic Card 1MB	200
SPIDER BlackWidow 1M	160
-LocalBus SPIDER	50
Lumina 24Bit 1MB	[illegible]
-Trident 1MB	30
170MB Hard Drive	30
Orchid Farenheit VLB	100
250 MB Hard Drive	45
340 MB Hard Drive	100
IDE VESA LocalBus	20
-Medium case	25
-Full Tower	45
Logitech Mouse	20
Microsoft mouse	25
486 DLC 40 MainBd	35
486 DLC 33 MainBd	30
486SLC MainBd	30

BASIC SYSTEM Includes: Motherboard &CPU, 1MB RAM, 1:1 2HD/2FD controller, w/ 1P/2S/1G, 1.2 or 1.44 MB FD, enhanced case w/Power supply, 101 Keyboard.

HARD DRIVES

80mb/18ms (IDE)- Conner CP30084E	$145
120mb (IDE) SEAGATE	158
130mb/15ms (IDE) Maxtor 7120AT	164
170mb/16ms (IDE) Conner CP30124	180
245mb/15ms (IDE) Maxtor	203
250mb/15ms (IDE) Conner	203
340mb/13ms (IDE) Maxtor/Corner	275/265
1 GB Toshiba MK537FB	780
1.2 GB - 13ms (SCCI) Fujitsu	870
1.7 GB - 13ms (SCCI) Maxtor	1125
2.1 GB - 13ms (SCCI)	1740

MULTIMEDIA

Creative Lab Soundblaster Pro	$105
Creative Lab Soundblaster Pro Deluxe	115
Creative Lab SoundBlaster Pro 16	145
MultiMedia Power w/ CD ROM+ SoundBlaster Pro+5 CD titles	330
MEDIAVISION ProAudio Spectrum 16	145
Pro16 MultiMedia System	640
Diamond Sonic w/SCSI	220
Fahrenheit SoundWave	220
NEC CD ROM 84M (280ms)	380
Mitsumi CD ROM w/Card (350ms)	155
SONY CD ROM 31A (490ms)	155
TOSHIBA CD ROM 3401 (200ms)	335
Texel CD ROM DM 3028N	350
Chinon CD ROM CDS535	320

PRINTERS

Panasonic KX-P1123/2023	$165/195
Panasonic KX-P1124i/1624	235/345
Panasonic KX-P2180/2123	155/215
Panasonic KX-P2124/2624	315/375
HP DeskJet 500/500C	295/395
HP DeskJet 550C/HP 4L	585/665
HP IIIP/HP IV/HP 4M	845/1325/1825

VIDEO CARDS

Trident VGA-512/1MB (1024x768,16bit)	$35/55
ET4000 16M colors	70
Diamond SpeedStar Pro ISA w/1MB	110
Diamond SpeedStar Pro VLB w/1MB	110
Diamond Stealth 24VESA Local bus w/1MB	150
Diamond Stealth Pro VRAM w/1MB/2MB	245/310
Diamond Viper VESA Localbus w/2MB	370
SPIDER 32VESA Local Bus w/1MB/2MB	93/143
SPIDER 32VLB Plus w/1MB/2MB	115/165
SPIDER BlackWidow VLB w/1MB/2MB	190/240
Orchid Farenheit 1280Plus w/1MB	145
Orchid Farenheit Localbus w/1MB	145
Orchid Farenheit VA VLB	165
Orchid Celsius 1MB	220
ATI Graphic Ultra plus w/2MB	230
ATI Graphic Ultra Pro ISA w/2MB	315
ATI Graphic Ultra Pro VLB w/2MB	315
ATI Plus VLB 2MB DRAM	280

MONITORS

Nanao F340iw 15"/F550i 17"	$645/930
Nanao F550iw 17"/T560i 17"	1100/1575
Nanao F760iw 21"/T660i 21"	2075/2279
NEC 3FGE/ 4FGE/5FG	574/674/1280
NEC 5FGE/6FGE	1,050/2,280
MAG 15F-MPR (1280x1024,0.28)	490
MAG 17F (1280x1024,0.26)	860
MAG LX 1564 15"	395
SONY CPD 1430s 14"/1604s 17"	575/895
SONY CPD 1730 17"	975
SONY GDP 2036s 20"/2038 20"	1870/2090
HITACHI CM-2095 20"/2087 20"	1270/1520
HITACHI CM-2187 21"	1765
Viewsonic 4E/6E/7	264/280/780
Viewsonic 15/17/20/21	435/940/1610/1850
KFC 15"/KFC 17"	415/745
Mini micro intrl (1024x768) monitor 0.28	240
Mini micro Non-interlaced Monitor 0.28	250

CONTROLLER CARDS

IDE w/IO	$15
IO with 2s/1p/1g	12
VESA Localbus IDE	35
Orchid IDE VLB w/ IO	59
Promise IDE DC 200	98
Promise IDE DC2040/1430VL	200/130
Adaptec SCSI 1522	80
Adaptect SCSI 1542C/1542C w/Kit	185/230
Adaptec SCSI 2742T/2742	325/295
Adaptect EISA SCSI 2742TK	355
Adaptect SCSI 2842 VLK	295
Ultra Stor SCSI 14F/24F EISA	190/350
Ultra Stor SCSI 34F VLB	260

KEYBOARDS

101 Enhanced keyboard	$18
Maxiswitch	28
Keytronics	30
Focus 2001/9000	36/60
Omnikey 101/102/Ultra	75/75/90

MISCELLANEOUS

Internal Modem 2400 Baud	$24
Fax Modem (9600 F, 2400 M)/Window	42
Fax Modem (14400 F, 14400 M)	120
US Robotics Modem 9600/14,400	144/148
US Robotics Fax/Modem 14,400	170
3-Button mouse	10
Microsoft mouse serial/bus/new	40/60/40
Logitech Mouseman serial (4000dpi)	40
Logitech Mouseman Bus (4000dpi)	55
Colorado Tape backup DJ-10 120M	105
Colorado Tape backup DJ-20 250M	155
Colorado Trakker 120MB	280
Colorado Trakker 250MB	330
Baby AT/Mini Tower case w/230W PS	45
Medium Tower case 2/230W PS	72
Full Tower case w/230W PS	85
Dual Floppy Drive 1.2+1.4MB	110

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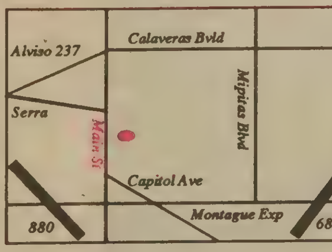

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1.2 MB 5.25" FD
1.44 MB 3.5" FD
Pro Audio Spectrum 16
Toshiba 3401 CD-ROM
Labtec Speakers
Mitac 15"
KeyBoard
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Home Use Multi-Media System

386SX33 MB
Mini Tower Case
4 MB RAM
120 MB IDE HD
IDE w/2SPG
1.2 MB 5.25" FD
1.44" MB 3.5" FD
VGA w/512K
Heyna SB Compatible
Mitsumi 350ms CD-ROM
Mustang Speakers
VGA 13"(Ref 6 mon)
KeyBoard
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Look at our other pages for more peripherals.

SYSTEM CACHE 64K on all DX MBs $25 more for 256K	Basic System M/B, 1MB mini tower IDE/2SPG 1 44 FDD 101 K/B	Basic System +40MB ide 14" mono Mon MGP Card	Basic System +40MB ide 13" VGA Col .28 Ref. 1 yr. War. VGA Card	Basic System +80MB ide 14" SVGA .39 SVGA 512 Card Total 4MB 5/17/93	Basic System +120MB ide 14" SVGA .28 SVGA 1MB Card Total 4MB +1.2 Floppy	Basic System +200MB ide 14" NI SVGA .28 SVGA 1MB Card Total 8MB +1.2 Floppy	Basic System +340MB ide 14" NI SVGA .28 SVGA 1MB Card Total 8MB +1.2 Floppy	Basic System +340MB ide 14" NI SVGA .28 SVGA 1MB Card Ttl 8MB +1.2 fdd CD-ROM, Spkrs Sound, J stick,
PENTIUM-VLB	$2,155					$3,071	$3,139	$3,384
486DX-66 VLB	$769				$1,438	$1,685	$1,753	$1,998
486DX-50 VLB	$708				$1,377	$1,624	$1,692	$1,937
486SLC2-66 IBM	$450				$1,119	$1,366	$1,434	$1,679
486DX-33 VLB	$571				$1,240	$1,487	$1,555	$1,800
486SX-25 VLB	$362				$996	$1,243	$1,311	$1,556
486DX2-66 EISA	$802		$1,094	$1,322	$1,436	$1,683	$1,751	$1,996
486DX2-66 ISA	$721	$926	$1,013	$1,242	$1,356	$1,603	$1,671	$1,916
486DX-33 ISA	$516	$720	$808	$1,036	$1,150	$1,397	$1,465	$1,710
486DLC40 ISA	$309	$513	$601	$829	$943	$1,190	$1,258	
386DX-40 ISA	$266	$471	$558	$787	$901	$1,147		
386SX-40 ISA	$233	$438	$525	$754	$868			
286-20 ISA	$215	$420	$507	$736	$850			

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This Matrix is updated frequently, please give us a call and we will fax you the latest version

VAR's and reseller's call for our reseller matrix.

All ASA build systems have an in-house system warranty of three years. Parts Warranty is 1 year.

......................TOP OF THE LINE LOCAL BUS GRAPHICS/CAD WORKSTATIONS........... add $1499 for pentium CPU

SPECS	DIAMOND	ATI	ORCHID	NUMBER NINE	MUSTANG	PEGASUS
Motherboard	DIAMOND Fastbus	MICRONICS MX-30**	ORCHID	AMI Super Voyager**	MUSTANG**ISA/VESA	PEGASUS M EISA/VESA
Power	486-66 256K CACHE	486-66 256K CACHE	486-66 256K CACHE	486-66 256K CACHE	486-66 256K CACHE	486-66 256K CACHE
Video Power*	50 winmark	26 winmark	50 winmark	42 winmark	54 winmark	54 winmark
RAM	8MB-70 exp to 128MB	8MB-70 exp to 64MB	8MB-70 exp to 32MB	8MB-70 exp to 64MB	8MB-70 EXP TO 32	8MB-70 EXP TO 128MB
BIOS	DIAMOND	PHOENIX	AMI	AMI	AMI	AMI
Exp. Slots	2 VESA, 5 ISA	2 VESA, 6 ISA	2 VESA, 5 ISA	2 VESA, 6 ISA	2 VESA, 5 ISA	2 VESA, 6 EISA
Floppy Drives	1.2, 1.44 Teac Drives	Same	Same	Same	Same	Same
HFC/IO	32 bit orchid VLB	32 bit orchid VLB	32 bit orchid VLB	32 bit orchid VLB	32 bit mustang VLB	Promise w/2MB Cache
Case,230 UL	Med Tower 230 PS	Same	Same	Same	Same	Same
Keyboard	Keytronic/Maxi Switch	Same	Same	Same	Same	Same
Video Card	DIAMOND-VIPER	ATI-ULTRA PRO	ORCHID CELSIUS 9000	#9 LEVEL 11	SPIDER BLACK WIDOW	SPIDER BLACK WIDOW
Spc. Features	2MB VRAM	2MB VRAM	1MB VRAM	2MB RAM	1MB DRAM	1MB DRAM
	1280X1024X256Clr 74Hz NI	1280X1024X16Clr 74Hz NI		Virtual rsltn upto 2048x1024	1280x1024 16clr 60Hz NI	1280x1024 16clr 60Hz NI
	1024x768x66kClr, 76Hz NI	Same	Same	1024x768x66KClr, 100Hz NI	1024x768 256clr 72Hz NI	1024x768 256clr 72Hz NI
32bit Proc	WEITEK P9000	MACH32	WEITEK P9000	S3 928 GUI Accelerator	S386C805	S386C805
Video Mnfr #	408-736-2000	416-756-0711	510-683-0300	617-674-0009	408-956-1231	408-956-1231
Price	$1,687	$1,841	$1,473	$1,920	$1,433	$1,767

These Workstations Do Not Include Monitors & Hard Drives

* PC magazine 2.5

**Intel P24T Socket

Add Hard Drives, Monitors, Multi Media Components, And other peripherals as per your need. [Look at our other pages for specs and prices.]

Professional Multi-Media System

486DX2-66 w/256K
AMI Enterprise III
Diamond Full Tower
32 MB RAM
AMI SCSI/LAN VLB
Diamond Viper VLB
1.2 GB Toshiba HD
1.2 MB 5.25" FD
1.44 MB 3.5" FD
TrueVision Targa+ 16
Toshiba 3401B CD-ROM
Labtec CS800 Speaker
Hitachi Accu PS21
Microsoft Mouse
Focus 9000 KB
DOS 6.0
Windows 3.1
..........$8539

Student Multi-Media System

483SX-25 VLB
Mini Tower Case
8 MB RAM
245 MB IDE HD
IDE w/2SPG
1.2 MB 5.25" FD
1.44" MB 3.5" FD
Orchid Fah VLB w/1MB
Pro Audio Spectrum 16
Mitsumi CD-ROM
14" 1024x768 .28
Mustang Speakers
KeyBoard
CD 6PK Bundle
..........$1775

(408) PCs-FOR-U ASA COMPUTERS 1-800-REAL-PCs

LOCAL BUS

MOTHERBOARDS

(Many of our new M/Bs have Pentium Socket)

Mustang 486SX-25	$185
IBM Alaris 486SLC2-66, 64K	$288
MustangT 486-33/50/66...w/256k ...w/Pentium Socket	$428/579/635
MustangF 486-33/50/66 w/256k	$394/545/601
Pegasus M vlb Eisa/Vesa Pentium ready ...486-33/50/66.w/256K	**$545/695/751**
ORCHID 486-33/50/66-256K	$432/582/638
Micronix 486-33/50/66	**$692/842/898**
AMI Super Voyager 486-33/50/66 w/256k	**$696/846/903**
AMI Enterprise IV 486-33/50/66 w/256k ....EISA/VESA	**$918/1068/1124**
Capricorn T Pentium 60MHz 512K	$2034
Sagitara H Pentium 60MHz PCI 512K	$2486

CONTROLLERS

Mustang IDE/IO	**$39**
ORCHID IDE/IO vlb	$63
DTC 2272 VLB IDE / IO wo/Game	**$60**
DTC 2270 VLB 8.3MB/sec IDE / IO	**$79**

(currently we can offer only 15 days warranty on Pentium CPUs)

DTC VLB 3270 SCSI	**$120**
Promise DC-4030 VLB 4HD/2FD	$174
Forex Bus-Master VESA, 50Hz	$204
BusLogic BT445S VLB Fast SCSI-II	$287
Mustang IDE/IO Cach15.6mb/sec	$129
UltraStor SCSI 34F, 32k Card..10mb/sec	$257
UltraStor SCSI 34F, 32k Kit	**$316**
AMI SCSI VLB	**$471**

GRAPHIC ADAPTERS

(wm = winmark ver2.5)

DIAMOND Stealth 24vlb S3-805.1mb dram	$164
DIAMOND Stealth pro 1/2MBram, 36wm	$257/336
DIAMOND Viper 1/2MB, 9000, 50wm	$296/382
ORCHID Fahrenheit S3-805, 1/2MB	$149/194
ORCHID Same w/voice annotation	$196
ORCHID Celsius 1MB	$228
ORCHID P9000 2MB	$363
Spider 32 VLB 1MB/2MB, 20 WM	$93/139
Spider 32 VLB Plus 1MB	$107
Spider Blk windows 1MB 54 WM	$204
spider Blk windows 2MB	$277
ATI Ultra Pro, 1/2MB, 26wm	$296/353
Mustang VLBCirrus logic1/2MB	**$78/123**

NOTEBOOKS

ESCORT

386SL/25, 80MB, 2MB-CLR	$1760
486SLC/33, 80MB, HDD, 2MB	$1395

BONDWELL

486SLC/25, 80MB, HD, 4MB	$1429
486SLC/33, 130MB, HD, 4MB	$1569

TWINHEAD SLIMNOTE

386 SXL-25, 2MB, 60MB / 80MB	$1294 / $1339
486 SLC-33, 2MB, 80MB/130MB	$1650 / $1794

LEADING EDGE

386 SXL-25, 4MB, 80MB	$1431
386 SL-25, 2MB, 80MB, COLOR	**$1980**

CHAPLET/SUNRACE

386 SX25, 4MB, 80MB/120MB	$1199/$1399
486 SLC, 2MB, 80MB/120MB	**$1475 / $1599**

(........the only notebook w/SCSI port........)

Call for high end notebooks and notebook accessories....

MOTHERBOARDS

(Many MB,s have Pentium Socket, See Local Bus Section)

286-12/20	**$40/52**
386SX-33/40	**$69/73**
Stallion 386DX-40 w/64k Cache	**$107**
Stallion 486SLC-25 Cyrix	**$119**
Stallion 486SX25	**$163**
Stallion 486DLC-33/40 w/64K	**$133/145**
Stallion 486SX33 64k	**$207**
Stallion 486DX-33 with 64/256k	**$366/377**
Stallion 486DX-50/66 w/256k	**$528/584**
Stallion EISA 486DX-33/50 w/256k	**$449/599**
Stallion EISA 486DX2-66 w/256	**$655**

Call for pricing of M/Bs w/o CPU

CONTROLLERS

IDE 2FD-2HD/4FD-2HD	$12/26
IDE w/ 2SPG..gen	$16
IDE Caching Ultrastor 15C (upto 8MB)	**$195**
IDE Caching Promise DC200 2FD/4HD	**$112**
IDE Caching Promise DC2032 2FD/4HD, IO	**$149**
IDE EISA DTC	$135
Kouw 531 4Port Serial wo/w16C550	$69/109
Kouwell 2spg 16C550	$45

SCSI

Future Domain Comp	**$52**
Trantor SCSI Adapter	**$67**
Future Domain TMC1680 SCSI II C/K	**$165/245**
DTC3292K..7HD&4FD	$349
DTC3290AS 7HD&4FD Caching	**$486**
ADAP 1522 Card/Kit	**$79/142**
ADAP 1542C Card/Kit	**$199/245**
ADAP 1542C+ Kit	**$310**
ADAP 2742 EISA Fast SCSI2 C/K	**$319/379**
ALWAYS IN2000/IN2000-Pro SCSI1	$179/225
BusLogic BT747S EISA Fast SCSI2 Kit	**$395**
Ultar24F EISA SCSI HD/FD	**$365**
Promise DC2040 Caching(upto 16MB)	**$215**
AMI EISA Cache	**$499**
DPT Smart CachePlus+EISA SCSI	$427
Trantor348 Parallel Port to SCSI	$179

ESDI

Mylex DCE EISA SCSI Caching Ctlr	**$542**
DTC	$127
Ultra 12C 1/4MB	**$370**
Ultra 22F Caching EISA	$340

ADAPTERS

(See Local Bus and CAD Sections too)

MGP	$12
Color Card	$23

VGA/SVGA

VGA 256k	$26
Trident 512K/1MB	$35/52
Tseng 1MB	$78
Mustang 1MB Window Accel	$58
Diamond Speedstar Pro	**$139**
Diamond Stealth 24	**$164**
Fahrenheit Plus wo/w VA	$165/219
Hercules Graphite HG210SVGA 1280x1024I w/1MB	**$255**
Hercules Graphite HG420SVGA 1280x1024I w/2MB	**$440**
AMI Fast View w/2MB Weitek P9000	**$490**
AMI Fast View EISA VGA Graphics w/1MB	**$call**
ATI Ultra Grpx 1MB w/Mouse	**$239**
ATI Ultra Plus w1/2MB	**$219/245**
ATI Ultra Pro w1/2MB	**$329/365**

MONITORS

MONO

Mono 12"	$78
Mono 14"....amber/white	$89
Mono 9" VGA	$125
Mono 14" SVGA 1024 x 768	$112

VGA/SVGA

VGA 13" .28 Color.refurb..1yr	**$160**
VGA 14" 640 x 480, .51	$173
SVGA 14" 1024x768 .39	$192
SVGA 14" 1024 x 768, .28 dpi	**$227**
CTX Autoswitch 1024, .28 dpi	$252
SVGA 14" 1024x768 .28 NonInt	$251
Black SVGA 1024,.28 I/NI	**$279/320**
CTX 14" 1024 .28dpi Hitachi NI	**$270**
Viewsonic V6E 14", 1024 .28 NI	$323
Viewsonic 15, 1280 .28 NI	$530
Sony 1430S 14" 1024 MicroPro MPRII	$563
Lion Tech 15" .28 NI	$355
Samsung 15" NI Flat .28dpi 72 Hz	$449
Sampo KDM1566 15" 1024 .28 NI	$439
Royal 17" .26 1024	***$665***
Mitac 17" .31dpi 1024 72Hz NI	**$475**
Sampo KDM1766 17"	$655
Maganavox20" 1280 x 1024 NI	**$1250**

See Many High-End Monitors in the Engineering/CAD Section.

CASES/PS

Baby Desk/Mini Tower w/ PS	**$49**
Medium Tower	**$77**
Full Tower/Super T. w. 300P/S	**$89/169**
Rack Mount W/PS	**$259**
File Server w/ 400W PS, 3 Fans ....12 F/HDD, black/beige	**$439**

DIAMOND (Black/Beige)

Baby Desk/Tower w/PS	**$79/82**
Medium Tower Reg/Big w/PS	**$89/119**
Full Tower w /PS	**$129**

External HDD Cases

1 HH...65W	**$89**
1FH/2HH...65W	**$110**
2FH/3HH...65W	**$137**
SCSI Cables Int/Ext	**$9/10**

Power Supplies

PS2 200/300W	**$40/95**
Full Tower 230W	**$58**
Full Tower 300/400	**$80/154**

KEYBOARDS, MICE

Spill Resistant/Mitsumi	$20/17
MaxiSwitch / M-Click	$29/34
KeyTronic/Black 101	$32/39
Small 11.5" 84 Keys	$42
Russian Keyboard	$28
Japanese Keyboard, 106 Keys	$70
Fujitsu 3400	$46
SEJIN J-Mouse(mouse under 'J' Key)	**$89**

Also line of European/Arabic KBs

S-Mouse/TBall	$9/21
LogiTech wht box Ser/Bus	$33/45
LogiTech MouseMan Ser/Par	$64
Microsoft white box S/B	$39/69
MS Original S/B V. 2.0	$57/80
BLACK SERIAL	**$19**

HARD DRIVES

Floppy Drives

Teac 1.2/1.44MB	$47/42
Teac Dual Floppy 1.2 + 1.44 MB	$116
Teac 2.88 MB	$89
Toshiba 2.88MB	$58
(w/contl & 2.88 floppy disk)	$94

FLOPTICALS

IOMEGA 21MB w/1 Disk, Cable	$419
YE-DATA 21MB w/5 Disks	$392

2.5" NOTEBOOK DRIVES

QUN 120 /160MB 16msec	$245/419

IDE

ST 42MB 27 msec	$114
CON 80/120MB 19 msec	$151/179
QUN 85/127MB 17 msec	$151/179
MXT 131/540MB 14/8msec	$162/740
CON/QUN 170MB 13/17 msec	$208/186
QUN 240MB/MXT 245MB Fast/15 msec	$241/227
CON/WD250MB 14msec	$217/222
WD 340/MXT 340MB 12/14 msec	$264/292
CON 340MB 13msec	$260
WD 425MB 13msec	$353
FUJ 520MB 11 msec 5yr	$560
QUN 525MB Fast	$538
CON/MXT 540MB 12/8msec	$499/660
MICROPOLIS 1.05/1.75GB 10ms	$1025/1325

SCSI - 3.5"

CON 170MB 17msec	$193
CON 212MB 12 msec	$280
MXT 245/QUN 240MB Fast	$220/240
MXT 340MB 15 msec	$330
FUJ 520/QUN 525MB 11 msec 5 yr	$593/550
MXT 540MB/CON 540 8/12 msec	$650/537
TOSH 877MB/1.2GB 12 msec	**$730/880**
MXT 1.2GB 8 msec Magix	**$1272**
MICROPOLIS 1.5/1.75GB 10ms	$1025/1325
HP1.2GB 10.5msec	$1040
ST/FUJ 1.2GB 10 msec	$918
QUN 1.0/1.2GB <10 msec	$920/1036
DEC 1.6GB 9.5 msec	$1160
CON 1.67GB 10.5msec	**$1015**
ST 2.1GB 9 msec	**$1775**

SCSI - 5.25"

HP 1.7GB/2.0GB 11.5 msec	$1830/2030
ST 1.7GB 11 msec Elite I	$1715
Fuj 2.0GB/2.4 11/12 msec	$1700/1646
ST 2.2GB/2.5GB 13 ms/11 ms EliteII	$1569/1980
ST 3.5GB 11msec	$2212

SUPER HARD DRIVES

Seagate Barracuda 3.5" HH (8 msec ....avg. seek, 4.17 msec lat., 7200 RPM)

Barracuda 1.7/2.5 GB	$1925/2100

EXTERNAL HRD. DRV. SUBSYSTEM

FOR EXT. HARD DRIVE, ADD $99

FLASH CARD HARD DRIVE

ST 75A 1.8" 5.2MB IDE<1.5MS	$484
ST710A/720A 1.8" 10.4MB/20.9MB	$888/1177
ST 740A 1.8" 41.9MB IDE<1.5ms	$2068

TAPE DRIVES

(<500MB TAPE-BACKUPs)

Colorado 120 / 250MB	$105/167
Colorado KE-10 External kit with card	$105
Colorado External port card	$37
FC-10 high perf card	$85
Colorado Trakker 120 / 250MB	$295 / 340
Archive 250MB w/QIC, 15MB/min, 1"H	$150
Archive Viper 250MB hh SCSI I/E	$349 / 449

(>500MB for PC / SERVER)

Viper 525MB hh SCSI Int/Ext 6MB/sec	$475/575
ARCHIVE 4320 NT 2.0GB DAT DDS 3.5"	$875
ARCHIVE 4324NT 4.0GB TURBO DAT DDS-DC 3.5"	$1075
SONY SDT2000 2.0GB DAT DDS 3.5"	$870
SONY SDT4000 4.0GB DAT DDS DC 3.5"	$979
SONY SDT5000 4.0GB DAT DDS -2 3.5"	$1245
Colorado 2.4 / 4.0 GB Qic 5.25	$940/1499
HP 2GB DAT 4mm Int/Ext	$989/1075
HP 4-8GB DAT 4mm Int/Ext	$1128/1179
WANGDAT 3100 2.0GB 4mm Int/Ext	$935/1045
WANGDAT 3200 4-8GB 4mm Int/Ext	$1030/1140
EXABYTE 750MB HH SCSI MINI Int/Ext	$692/860
EXABYTE 8205 5GB HH 2yrs Int/Ext	$1415 / 1679
EXABYTE 8505 10GB HH 2yrs Int/Ext	$2239/2505

..(above drives require special contr & soft drivers)

TAPE BACKUP DRIVERS

Novaback for DOS//OS/2	$89
Novanet Multiuser NLM	$439
SYTOS for DOS/NOVELL, GEN	$120
ARCserve Solo	$185
CONNER-EXEC NLM BACKUP SW	$445

ERASABLE(Rewritable)

TEAC 128MB 3.5" Int/Ext	$749/859
IBM 127MB 3.5" Int/Ext	$833/943
HP 1.3GB 5.25" SCSI-2 EXT	$2799
MAXOPTIC 1GB Tahiti IIM 35msec	$2300

REMOVABLE DRIVES

Syquest 44MB Dr	$249
......W/Ext Case, Cables, Cart, Cont	$379
Syquest 88/105MB Dr	$308/469
Bernoulli 44/99 Insider	$907/840
IDE: Upto 1GB removable kits	$39
SCSI: Upto 1GB Removable Kits	$138

STORAGE MEDIA

Floppy 1.44Bulk	$.79
Floppy 1.2 Bulk	$.49
Tape DC2000XL	$18
Tape DC2120 250MB..Formatted	$18.5
Tape DC 6250 5.25", 1/4" Cartridge	$27
Tape DC 6525 5.25", 1/4" Cartridge	$31
TK50 for DECs	$26
DT-2400 2.4GB .25" Cartridge	$54
DT-4000 4.0 GB .25" Cartridge	$57
DAT 4mm 60/90 mtr	$19/29
DAT 8mm 54/112 mtr	$18/24
Syquest 44/88/105MB Cart	$62/94/85
Bernoulli 44MB/90MB 3Pk	$315/415

OPTICAL CARTRIDGES

Mag neto-Optical 650MB Cartridge	$159
600MB/650MB 5.25"	$109/149
128MB 3.5"	$59
10024 B/S WORM 5.25"	$109

SOFTWARE

SYSTEM UTILITIES & PROGRAMMING

Norton Utilities v7.0/upg/commander	$108/97/39
Norton Desktop for Windows v2.2	$104
pcANYWHERE 4.5/1.0 for Windows	$114/118
PC Tools 8.0a/ for Windows 1.0	$114/97
After Dark 2.0 for Windows	$25
386 MAX 7,0/QEMM v7.0	$59/69
Stacker 3.1 DOS & Windows/OS	$97/123
MS DOS 6.0/upgrade to v6.2	$48/49
MS Windows 3.1/for Workgroups	$63/47
MS Windows for Workgroups/ 5 User	$67/267
MS Windows NT/upgrade	$318/263
IBM OS/2 2.1/ upgrade	$147/99
DESQview /X v1.2	$163
Laplink V for Windows	$103/53

GRAPHICS & DESIGN

CorelDRAW! 4.0/CD/ upg/CD	$383/363/$213/197
CorelDRAW! 3.0/CD	$127
Pagemaker 5.0 for Windows	$495
Aldus FreeHand 3.1/Photostyler 1.1	$375/490
QuarkXPress for Windows	$565
HiJack Pro 2.1/2.0 for Windows	$97/87
Harward Graphics 2.0/upg for Win	$289/88
Picture Publisher for Windows 4.0	$395/195
Adobe Photoshop 2.5 for Windows	$595
FileMaker Pro 2.1	$127
Micrografix Designer v4.0/upg	$485/197
FrameMaker for Windows/upg	$585/217
PerForm PRO Plus by Delrina	$265

BUSINESS APPLICATIONS

MS Office/professional/upg/upg	$465/580/395/495
MS Word for Windows 2.0c/upg	$281/125
MS Works 3.0/Win v2.0/upg	$99/123/79
MS Excel 4.0 for Windows/upg	$284/108
MS Access for Windows	$319/99
MS FoxPro 2.5 for Windows	$313/99
MS Project 3.0 for Windows/upg	$418/143
Smartsuite 2.0 for Windows/upg	$445/395
Lotus 123 v4.0 for Windows/upg	$299/99
Lotus 123 v2.4/v3.4/upg for DOS	$385
Ami Pro 3.01/ upg	$239/99
Approach for Windows/upg/Improve	$239/99/93
Lotus Notes starter pack for Win	$899
Borland Office for Windows v1.5 upg	$245
Paradox for DOS v4.0/Win version	$495/125
dBASE IV v2.0 for DOS/upg	$450/99
Wordperfect 6.0 for DOS/upg	$267/99
Wordperfect 5.2 for Windows/upg	$255/99
OmniPage Office/OmniScan for Windows	$645/359
Winfax Pro 3.0 for Windows	$77
PackRat 5.0 Personal info. mgr	$277
Lotus Organizer for Win/ECCO.Super PIM	$98/75
Procomm Plus 2.1/ 1.02 for Win	$67/97
Quicken for DOS 6.0/Win v. 3.0	$45
Quickbooks/Win ver 2.0	$87/95

NOVELL WORKSTATION

Novell Ready and Tested. W/Remote Boot Prom, Keyboard and Monitor; Diskless.

$295.00

DISK PACK DRIVES

Portable Mechanically Protected Hard Drives for High Security Applications - Millitary and Corporate.

$Call

RAID DISK ARRAYS

Redundant Arrays of 'Inexpensive Drives for fault tolerancy. 5 channels and hot swapping.

$Call

Fault-Tolerant SERVERS

Novell or Unix Servers w/ Disk Mirroring & Duplexing, Synchronous Disk Support and Hot Swapping

$Call

VOICE MAIL SYSTEMS

For small and medium size companies - phone system automation. PC based 2, 4 or more ports.

As low as **$5500**

EXPORT QUALITY PCs

386SX-40, 1MB, IDE, I/O, 1.44FDD, 14" SVGA Monitor, 512K Card, K/B, Mouse (Min 50 pcs)

$439

MICROMARKETPLACE

ENGINEERING CAD/CAM

Monitors

Nanao

F340iw 15", .28, 72Hz, MPRII, Microp.	($695) $753
F550iw 17"FST 1280NI, .28, 75Hz NI	($1115) $1172
F760iw 21"FST 1280NI, .31	($2125) $2210
F550i 17", FST .26, MPRII	($1047) $1100
T560i 17", FST .28, MPRII	($1680) $1800
T660i 20" Trin, 1280, 72Hz, MPRII	($2435) $2580
F750i 21", .31, 1280, 72Hz, Micrp	($2068) $2148

Hitachi

CM1785MV 17' FST, .28. 1280NI, MPRII	($889) 930
CM2095 20" 1280 Anti Glare	($1279) $1376
CM2087 20" 1280 72Hz Microp	($1569) $1689
CM2187 21" FST 1600x1280 Micr	($1925) $1960
CM2187-515 21" .28	($2125) $2195
ACCUVUE PS-21	($2079) $2216
ACCUVUE PS-21A/PS-21 .28., Micr.	($2245) $2391

Sony

CPD1430/1730 14"/17"	($563) $630/($965) $1047
GDM2036S 20", 1280NI, MPRII	($1975) $2089
GDM2038 20"	($2212) $2347

Sampo

Sampo KDM1777 17" NI 1280x1068 .28dp MRPII	$899
Sampo KDM2077 20" NI 1280x1068 .31dp. MPRII.	$1495

Magnavox

20CM64 20", 1280NI, .31	($1160) $1213

NEC

3/4FGE 15", .28, 1024NI	($577) $626/($712) $738
5FGE/FG 17", .28, NI	($1076) $1151/($1295) $1405
6FG 21", .28, 1280NI	($2285) $2350

MAG

MX17F, 17" .26, 1280NI, Micro Org/Oem	($900) $940
LX1564 15" .28, 1280NI	($410) $430
MX15F 15"/15" MPR II	($469) $488/($515) $534

TOSHIBA

Toshiba 21" .28dpi	($1300) $1450
NOKIA 17" 447B Trinitron Tube .25dpi, 1280	$($1070) $1175

CAD ADAPTERS

(Also See Local Bus and Adapters Sections)

NUMBER NINE - #9GXI/GXE

L23 WIND/ACAD, T34020, 1280, 16C	$929
L25F, 40MHZ, WIN/ ACAD,, 1280, 256C	$1195
L29 T34020, 1024X768X16.7M COLOR	$1315
L11/I12 S3928, 2MB/3MB VRA	$365/438

HERCULES

GRAPHITE 1 MB, VRAM 1280 Accel	$289
Chrome C731, 40MHZ, 3MB, 72 Hz	$1399
Super S XP610/821, 40MHz, 1MB	$749/1399

MATROX

MGA-IMP/1/A//IMP/2/A//IMP/3/A	$495/695/985
Impression UltraXG3ASIC 1600, 7 MB	$3595

METHEUS CORPORATION

Premier 928VL4S386C928, MultiDisplay	$619
1104 Plus 256 Hz, MultiDisplay	$1295
UGA 1228Hz 256, 60/74Hz	$1895/2095

NATIONAL DESIGN

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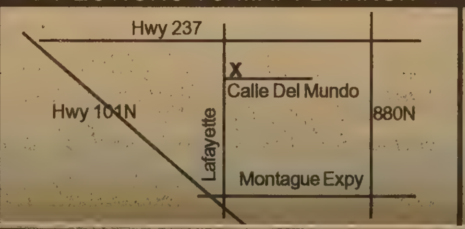

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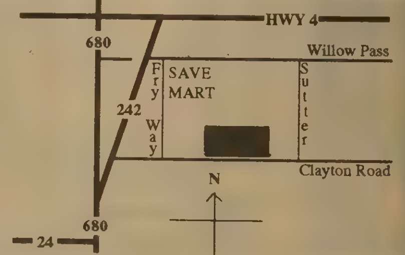

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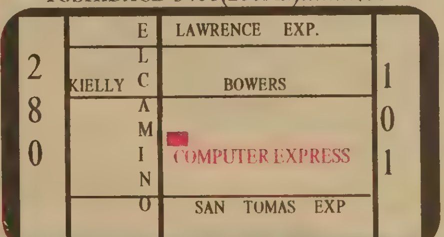

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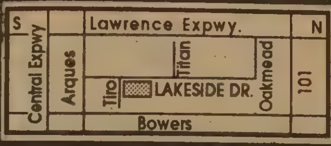

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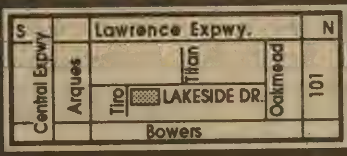

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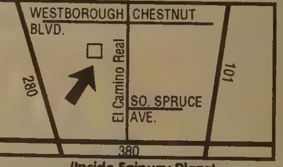

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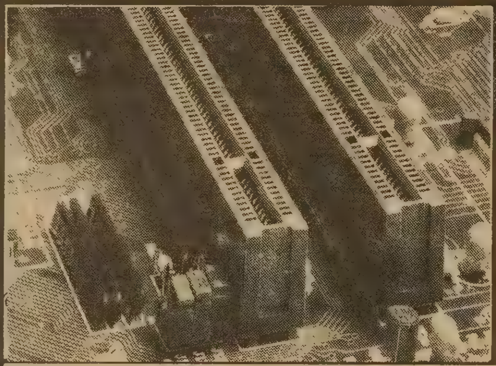

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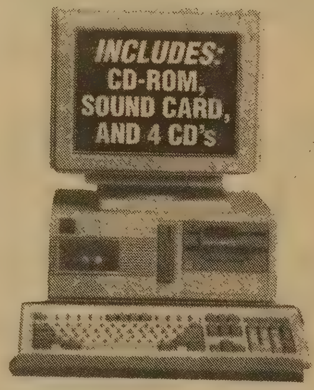

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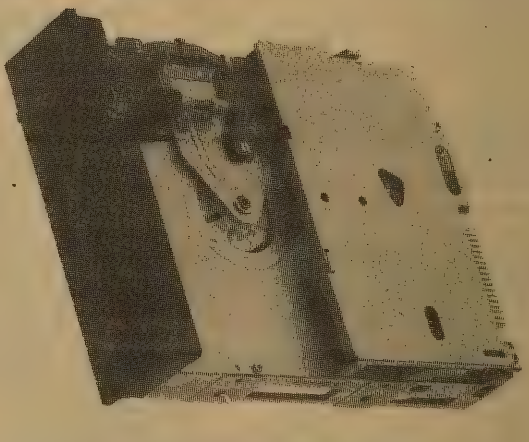

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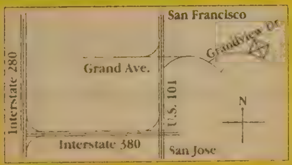

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The Newton Quiz/Reality Check

Reports From Actual Users

BY DAVID MORGENSTERN

BMUG

Have you rushed down to your nearest computer store to check out the Newton MessagePad? Perhaps you've played with it, bolted down in an anti-theft brightly colored kiosk display. Or perhaps you've been swayed by the burial mound-sized pile of negative critiques of the device.

I've put together a little quiz to check your understanding of Newton:

1) The Newton is ...
a) a true and loyal companion.
b) a teeny-weeny replacement for your desktop computer.
c) a new consumer model of computing.
d) one of the many reincarnations of Elvis the King.

2) Personal Digital Assistants are ...
a) just another name for a secretary.
b) available in most locations, except where forbidden by strict community standards.
c) the first of many digital consumer information products.
d) further examples of the replacement of American jobs by technology.

3) The Newton MessagePad's handwriting recognition is ...
a) its most appreciated feature.
b) letter-by-letter recognition.
c) the product of Russian technology.
d) the "mess" in MessagePad.

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4) Which one of these calculators does *not* come with the MessagePad?
a) Metric to US measurement conversion.
b) Currency Exchange Rate conversion.
c) Sex Change Rate calculation.
d) Monthly loan payment calculation.

5) Which of the following are examples of Newton Intelligence?
a) Sucks up to new owner by saying "gesundheit" after a sneeze.
b) Scores perfect 1600 on new version of SAT.
c) Fine-tunes handwriting recognition as owner uses the MessagePad.
d) Won't allow owner to order goat's-milk feta, pineapple, and jalapeño pepper pizza through nationwide cellular pizza ordering network.

THE ANSWER SHEET

Question 1. *c) The Newton is a new consumer model of computing.* You have to carefully read and listen to Newton advertising. The MessagePad is never actually called a computer—there's always a little hedging. The Newton can be "as powerful as," but not precisely a computer. This is not grammatical nitpicking, but points to an entirely new way of computing.

The model of personal computing of the past fifteen years has been a general one. Computer hardware provides a platform for a multitude of diverse computing assignments. Your desktop computer can word process, crunch numbers, and communicate with buddies over networks and modems. Some will be accomplished better than others depending on the capabilities of the hardware and software you've purchased.

The MessagePad follows a consumer product model. This means that the device does not have to do everything that a "regular" computer does. The MessagePad combines a limited number of information organizing capabilities with communication technologies. Consumer products are designed from the ground up to be limited. Newton was never meant to compete with a desktop machine. So why do industry pundits keep comparing the not-a-computer Newton to the established model of computing?

The arrival of computing consumer products has exposed a serious intellectual break in the ranks of the computer elite. They just don't "get it." They're stuck in the old general computing worldview. They focus and clamor about perceived deficiencies that are actually irrelevancies.

It's easy to see this paradigm shift if we compare computers to other non-computer consumer products. Consider transportation. Desktop computers would be automobiles, and MessagePads, motorbikes. Would we think someone crazy to want to own both? They are totally different experiences. Another good example is cutlery. I own many different knives, each one specialized for a particular cutting task. But I would be hauled off as a menace to society, and myself, if I stuck them in my belt like a pirate chef. My Swiss Army knife provides portable cutting and tooth-cleaning, but it's no replacement for a bread knife. Count up the different flavors of radios, tape and CD players you own around the house, including the one in the car. This is the world of consumer products—lots of slightly different products for use in diverse situations.

Here's a checklist of suspect phrases and topics that have come up in recent critical articles about Newton technology. They are all warning signs of Newtonian denial.

- *It's not a good computer.* Close, but not on the money. Write a hundred times on the blackboard, "Not a Computer."
- *If only it had a keyboard!* Portable computers, the compact cars of the computing world, still follow old industry models.
- *If only it ran my regular desktop software!* Does anyone really think that shrinking down a graphic user interface for computers and slapping it on consumer devices will really cut the mustard? Newton has its own

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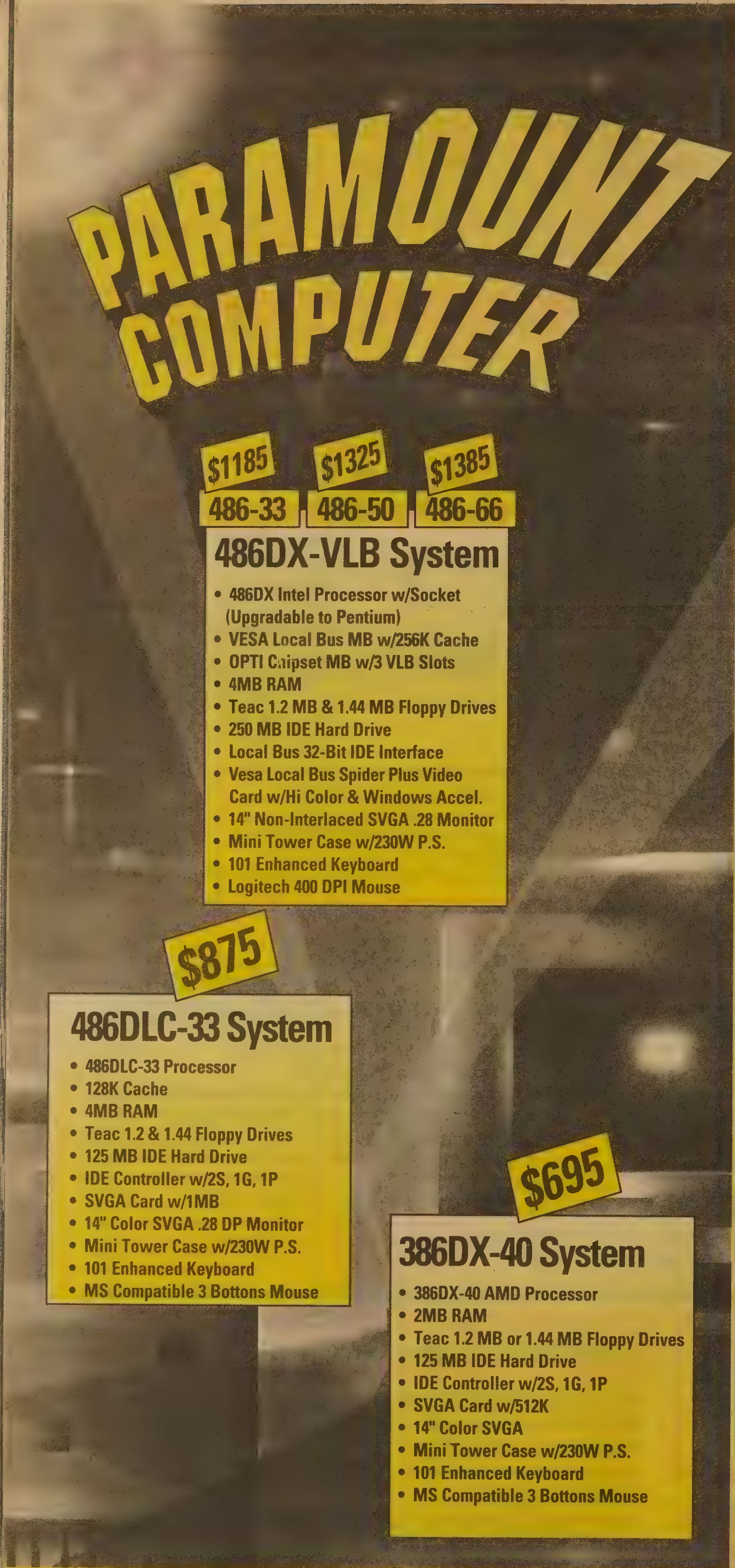

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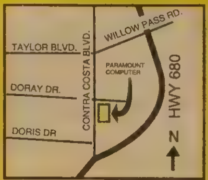

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- *Why isn't it like the EO and PenPoint systems?* These systems are genuine computers, but use a pen as the primary input device. You can and should be able to attach a keyboard to them. We still may see the Macintosh version of these systems, the reported Pen Duo, code-named Hancock.
- *Any mention of taking notes.* The MessagePad was designed to take and send short messages, not long notes. I would expect a pen-based notebook computer to take notes, but not the MessagePad. Martin Mazner, former publisher of *MacUser,* recently wrote an article entitled "Is Newton Doomed? Apple Needs To Go Back To The Drawing Board." He says, "Imagine trying to take notes at a business meeting with a notepad that was 2 1/2" by 5"... Perhaps the most telling evidence of Newton's inadequacy as a notepad comes from internal meetings at Apple... Few members of the group use the Newton for their note taking."

Marty attempts to give an insider ironic spin to his blasts at the MessagePad. Unfortunately, he has penned his own admission ticket to the Getting It—Not Club.

Original Macintosh owners know the mischief that Club G.I.N. can do to a new technology or computing strategy. The early pejorative labels that landed on the Mac had an incredible sticking power. The Mac is a toy. It should run MS-DOS software. It's not a business machine. The screen is too small (they may have had a point with this complaint). The graphic user interface will never catch on. Do you get it?

The arrival of computing consumer products has exposed a serious intellectual break in the ranks of the computer elite. They just don't "get it."

Question 2. *c) Personal Digital Assistants are the first of many digital consumer information products.* Apple reportedly will release several additional flavors of Newton in the upcoming year. These versions should not be thought of as traditional upgrades to the MessagePad, rather as differently focused devices. Apple has said that some PDAs will be CD-ROM book players. Others will focus on automating sales work.

Question 3. *c) The Newton MessagePad's handwriting recognition is the product of Russian technology.* The Newton's misunderstood handwriting recognition engine was developed by Paragraph International, a US-Russian joint venture. The recognizer uses a ten-thousand-word dictionary to assist in word recognition, which speeds up word identification. As Mike Doonesbury has discovered, it also means that misinterpreted words, or those not in the dictionary, can produce some wild prose. It also makes sure that the short messages you will be emailing and faxing to people are spelled correctly. Good and poor spellers can duke it out in the hallway.

Question 4. *c) The MessagePad does not come with a Sex Change Rate calculator.* If the built-in calculators are not sufficient, DublClick Software has come out with the GoFigure Calculator. It's a set

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Question 5. *c) Newton Intelligence fine-tunes handwriting recognition as owner uses the MessagePad.* Actually, Newton Intelligence is the name for the Newton's object-oriented, multitasking operating system. The Intelligent Assistance component of the system is always looking out for you. It will automatically capitalize words at the beginning of sentences, and keep improving its recognition of your handwriting. The Newton team also created a little game that helps teach your handwriting to the device.

I hope I've persuaded you to give the Newton MessagePad another look. It is technology that should not be dismissed out of hand. Evaluate it with an open mind, and consider the goals and strategy behind the screen.

MESSAGES FROM AN ACTUAL USER

I asked Hans Hansen, BMUG Publications manager and coeditor of *The Tao of AppleScript*, how he was getting along with his MessagePad. He thinks it's cool, and much like having an original Macintosh.

"It's a misunderstood beast. Everyone is concentrating on the handwriting recognition as the primary feature, and ignoring its organizational strengths. You can take lots of separate little notes that you can transform into text. You can have tons of little things, names, and dates, stored in a way that lets you easily find and reach them when you need to.

"I find myself needing my Newton around constantly. It's a real change from the PIM (personal information manager) on my PowerBook. I'd have to open the Duo, wait for it to wake up, wait even longer for the hard drive to spin up, and perhaps launch the application. It's really slow [the whole process] and a pain.

"It's much better than a paper organizer. There's just one effort to get data. You don't have to write everything down, and then enter it later. I make a change to a record once, and it's done. I've found it very useful to take notes about things that I'm doing on my Mac when I can't get to my PIM. The Newton is perfect for logging required codes used to solve successive levels of games. It's a somewhat silly use, but...

"The Newton Assistant interface is outstanding. I've used other pen-controlled devices and the Newton beats them easily. All the functionality is quick to pick up. One of the interface guidelines is that if you see some feature done once, you should be able to remember it. I hope that people will recognize the Newton's value."

A small caveat: A local computer journalist says that BMUGers' attitudes and testimony don't count. He feels that we're not "representative of the real world." I swear, we're the silicon salts of the earth!

TIP CITY

Newton-toting BMUGers have formed SIG Newton, a special interest group to share PDA information. Their meetings are the best place to see the MessagePad in action. Here are a couple of tips:

- If your MessagePad is coming up with nonsense or misspelled words in the recognition process, then you have a serious problem. The device has made you the life of the party, showing how funny and unintelligent the device can be.

You've most likely turned on the Words Not in Word Lists option in Preferences. This option lets the Newton recognize characters, instead of words. This is for the times when you want to add non-words, such as email addresses or aliases.

The Newton manual warns users to keep this option off, to "improve recognition accuracy and speed." When off, the MessagePad will return a kosher word, possibly the correct one. If a wrong word is returned, it will still be an actual word. Practice your hand shadows for the next party. Thanks to David Schwartz for this tip.

- Here's a Newton Secret Trick. Go into Preferences and select the Personal item. Erase the country name and enter "Graceland." It's not in the dictionary, so you'll have to use the keyboard emulator. Turn off the MessagePad, then back on again. The Newton light bulb that is displayed at startup is replaced by a Newt, the Team Mascot.
- Remember to pick up a copy of the BMUG Newton disk. It has all the latest shareware and freeware Newton programs. The disk is available from the BMUG office for $4 (plus $4 postage and handling). ■

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BMUG

Upcoming Events:

November 25	No meeting. Happy Thanksgiving!
November 29	BMUG West at Exploratorium museum in San Francisco. Doug Menuez *Defying Gravity* (Newton book); Provue Development, Power Team (personal information manager).
December 2	Fractal Design Corp., Painter X2 (graphics); Ashlar Inc., Vellum 3D (CAD).
December 9	Brøderbund, Print Shop Deluxe and Myst (CD-ROM game); Working Software, Toner Tuner and Working Watermark (print utilities).
December 16	Hewlett-Packard, new products; Guy Kawasaki, UnderWare (screen saver).
December 20	BMUG South at United Way Office in San Jose. Casady & Green, Conflict Catcher and more; another vendor to be announced.
December 23	No meeting due to winter holidays.
December 27	BMUG West at Exploratorium museum in San Francisco. To be announced.
Please Note:	BMUG meetings have returned to the Physical Sciences Lecture Hall. Call the the BMUG Announcement Line for the latest information on BMUG meetings, special interest groups (SIGs), and seminars! (510)849-9114.

WHAT IS BMUG?

BMUG is an educational, nonprofit, consumer advocacy group, organized to share information and provide critical direction to users and developers in the computer community worldwide. It is an independent advocate, not affiliated with any manufacturer, delivering trustworthy information and useful products.

Like any growing organization, it is many different things to its fourteen thousand international members. BMUG supports many special interest groups (SIGs), an 18-line bulletin board system (BBS), software library, weekly meetings, publications, and much more. BMUG also puts out a semi-annual 400+ page book that we call our "newsletter."

Our motto continues to be: *We're in the business of giving away information.*

Come and join in the dialogue at the BMUG main meeting every Thursday evening, 6:30–9:30 (or whenever we finish), in the Physical Sciences Lecture Hall on the UC campus. BMUG West and BMUG South are monthly meetings held in San Francisco and San Jose.

The BMUG office, 2055 Center Street (a half block from the BART station), is open to the public from 9 am to 5 pm. Please come by, say hello, and meet other members.

The BMUG Helpline provides volunteer technical assistance and telephonic handholding for our members. If your question can't be answered on the spot, we try to get you in touch with someone who can help. Of course, not every problem can have a happy ending—but we try. Improve your Macintosh education and help others by becoming a Helpline volunteer!

BMUG has one of the most up-to-date, comprehensive software libraries around with hundreds of disks filled with the latest versions of public domain or shareware programs. BMUG also produces CD-ROM collections, including the digital video TV-ROM™ Too, Font CD, and the BMUG PD-ROM.

Our new graphic user interface FirstClass 18-line BBS offers many of the latest versions of files in our software library as well as news, private mail, rumors, etc. With our multiline capability, you can have access to BMUG almost 24 hours a day. It's easy to use, fun, and a great resource.

BMUG can be found on most electronic services. BMUG can also be reached through the Internet international network through UG0001@applelink.apple.com.

To get some further information about BMUG please write to: BMUG, 1442A Walnut Street, #62, Berkeley, CA 94709. If you prefer to phone our business office call (510)549-BMUG, or fax (510)849-9026.

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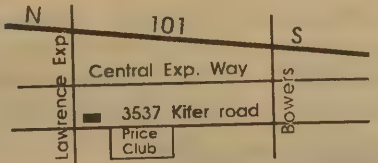

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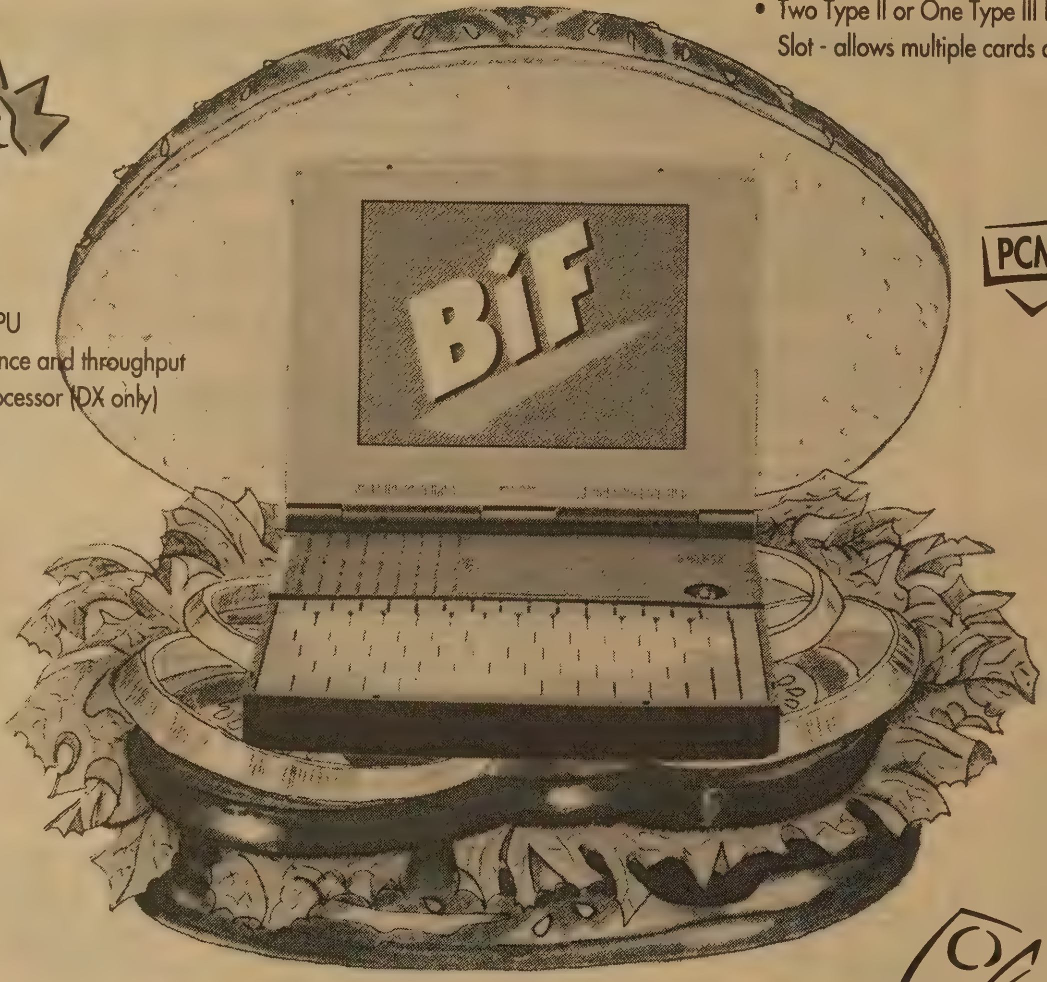

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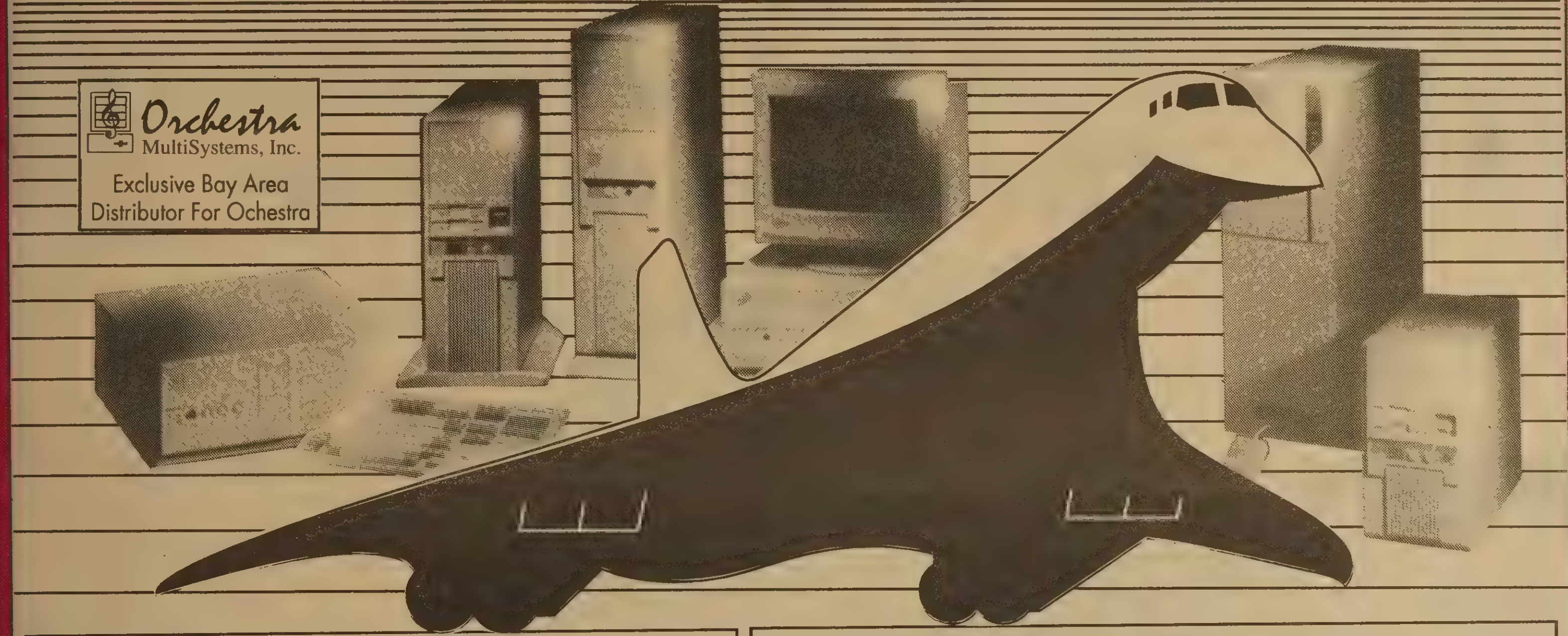

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BY FABIAN PASCAL

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No matter how sophisticated software is, there are always ways to improve and extend it, a fact that drives the add-on industry. This is particularly true of operating systems.

Whether certain functions should be built into the operating system or provided as add-on utilities involves a number of tradeoffs. In the former case, the OS vendor cannot be (and usually isn't) as effective with many functions as third-party developers can be with single functions—in fact, practice shows that even when the OS does provide certain functions, users end up substituting better add-ons for them. In the case where the OS vendor provides the utilities, there may be unacceptable release delays; certainly all users will end up paying for functions which may not all be necessary for some.

With add-ons, users spend considerable time and effort locating, installing, debugging, upgrading, and getting support for software from multiple sources, which vary in resources, skills, and commitment; also, there is usually less integration of various functions. Moreover, in multitasking environments such as OS/2, most problems stem from interactions among hardware, the operating system, and several applications; identifying—let alone resolving—them is usually non-trivial, and not easy for either users or vendors.

Given the way the industry works, what should or should not be built into OS/2 is not always clear. There is, to put it politely, no guarantee that you'll get better capabilities and support for an IBM function built into OS/2 than you would from a third-party utility vendor. For the foreseeable future you need to look constantly and aggressively for OS/2 utilities and enhancements, but also limit your involvement to only those that fulfill clear and important needs. Be prepared to invest some time and effort, and to accept less than satisfactory support.

A steady source of new software, and quite likely your best source for fast, effective help, is CompuServe. Among the several OS/2 forums, the most useful for the non-programmer individual user are OS2SUPPORT forum, where IBM actually supports OS/2 and the OS2USER forum, where developers and users exchange information about both OS/2 and applications. Their subject areas are listed below.

IBM OS/2 Users Forum+

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1 OS/2 Public Image
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3 OS/2 & Hardware
4 Application Quest.
5 Documentation
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IBM OS/2 Support Forum+

Message Sections Available:
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2 Install Questions
3 H/W - I/O Media
4 H/W - Platform
5 H/W - Displays
6 H/W - Printers
7 H/W - Miscellaneous
8 WPS / SOM Questions
9 ES / LS Questions
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12 Windows Appl. Quest.
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Fabian Pascal is a Palo Alto independent consultant, teacher, and writer specializing in relational database management, OS/2, and office and portable computing. An industry analyst, he teaches seminars, consults, and has published extensively. His second book, Understanding Relational Databases, *is forthcoming from John Wiley. He can be reached on MCI Mail (FPascal), CompuServe (73677,3306), and at (415)325-0646 (fax/voice).*

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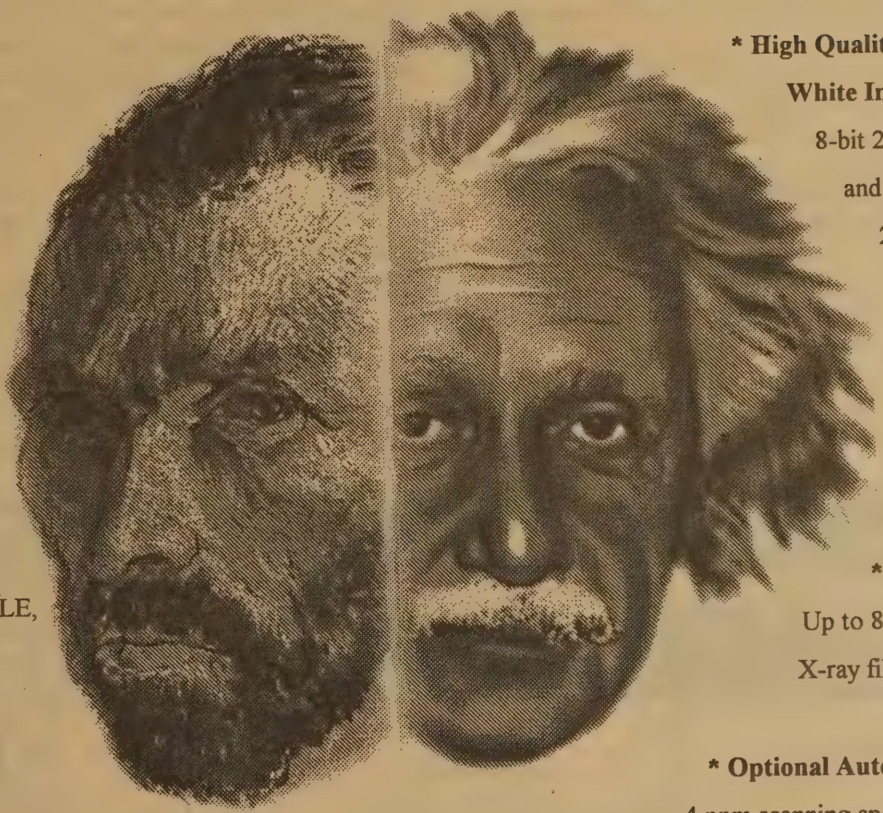

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These forums offer several advantages. First, posted problems are immediately exposed to IBM staff, application developers, and users, thus increasing the chances that somebody at least knows about them, or may even have workarounds or solutions. Since problems and solutions usually require cooperation, a public forum with lots of users and technical people is much more effective than an individual vendor. The process is also less cumbersome, time consuming, frustrating, and invisible than calling multiple long distance numbers and serving as liaison between uncooperative vendors.

Also, you gain access to problems experienced and resolved by others, so that you can prevent, avoid, or fix them at your end. Finally, the libraries are being continuously loaded with fixes, information files, announcements, drivers, and programs—freeware, shareware, betas, and demos.

CompuServe has recently introduced more affordable rates. If you send less than sixty email messages a month, you can get the basic package for $8.95/month, which also entitles you to a discounted rate for accessing the forums. ■

Useful Utilities Online

Following are commented short descriptions of some of the OS/2 utilities from Compuserve that I've found useful. Many of the programs are still in various stages of development and not all take full advantage of OS/2 (e.g. multithreading or WPS integration). These are neither reviews nor endorsements; the list doesn't reflect the diversity of what's available, but based on my preferences and experience, each program fulfills a need, seems to work, and is reasonably easy to use.

All files are in OS2USER forum library 4, except where noted otherwise.

COLOR CONFIGURATION UTILITY SYSCL2.ZIP

Shareware PM utility to configure system colors in a way easier than OS/2's palettes. Forty-one color items can be changed—from obvious items such as entry fields, pushbutton components, or menu bar components, to the more obscure items such as page backgrounds, icon text, shadow icon text, etc. Most color changes are visible immediately, and can be set temporarily or permanently. Includes many sample color templates that can be modified and saved to OS/2's INI file, or new templates can be created from scratch. The templates can also be saved to files and easily shared between computers. They can also be loaded from the command line (ideal for use in CMD files) to temporarily change colors when running programs that conflict with your preferred color scheme, or when generating screen captures destined for black-and-white printers.

This utility is more friendly than OS/2's palettes. It was, however, written originally for v1.x and upgraded for 2.x. It could do with an upgrade that takes advantage of the WPS and displays an actual image of the setting being changed on screen, instead of just its color.

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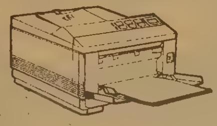

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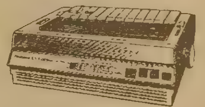

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SYSTEM RESOURCES MONITOR MEMSIZ.ZIP

Free 32-bit PM utility displays a small window that optionally shows the system date/weekday/time, elapsed time since bootup, available virtual memory, swap file size and free swapping space, total size of spooled files, approximate CPU load, number of active tasks, total free disk space, and individual disk drive free spaces. Each item can be set to display or not display, and the window adjusts its size to suit. The program cooperates with the OS/2 font and color palettes, and can be installed in English, German, Spanish, or Catalan. Source code is included.

This is a handy utility to configure to your taste and put in your Startup folder. It helps keep track of the size of the swapper file and the disk space available for it, and the CPU load (which tends to be hogged by some applications, particularly in DOS sessions).

DIRECTORY ENFORCER DIRM20.ZIP

A 32-bit PM freeware application that displays the results of a comparison between the file contents of two directories based on date and time, and then allows you to perform various functions (move, copy, delete) on those files in either directory/direction. Files may be selected manually or by match criteria. Straightforward and very useful, particularly when you want to upgrade files in directories, or do directory cleaning.

TREE INFORMATION TREE.ZIP

Free character-based utility visually displaying a directory tree, with an option to total the number and sizes of the files in each directory.

IBM has not replicated this DOS function in OS/2, and it comes in pretty handy, given the complex directory stucture of OS/2, particularly if you do not want to invoke the graphical Drives.

WPS BACKUP UTILITY (2.02) WPSBKP.ZIP

Shareware 32-bit PM utility providing an alternative to OS/2's Alt+F1 procedure. It backs up the customized OS/2 2.x WPS, and provides restore status and configuration data for a simple restore procedure it creates. The program can also be used (usually in organizations) to install a standard WPS user interface for user machines that have identical (or very similar) hardware configurations.

While OS/2 2.1 is much improved, the desktop may sometimes get corrupted. On the (hopefully rare) occasion that you need to use the restore procedure, this can save you recovery time, because it backs up and restores only the customized part of your desktop. Used after changes are made to the desktop, it is much better insurance than the desktop recovery procedures built into OS/2.

WINBACK WBK20.ZIP

Free 32-bit program translates double-clicks with the right mouse button to push a window to the bottom of the current stack of open windows tiled on-screen.

continued on page 260

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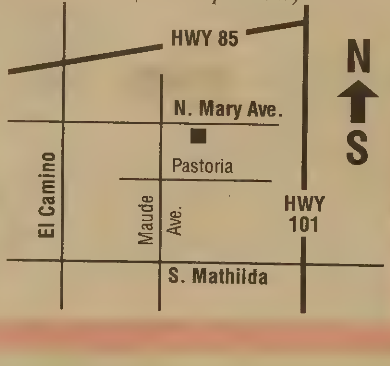

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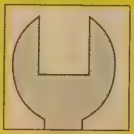
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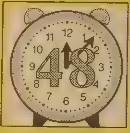

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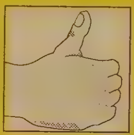
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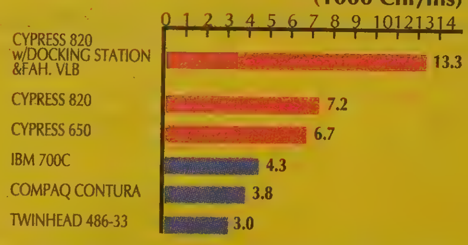

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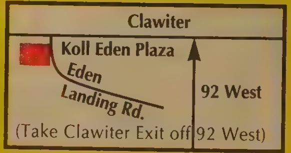

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New Homes For Old Computers

Somewhere Out There, Some Deserving Soul Can Use Your Computer

BY GISELLE BISSON

Somewhere on this earth, a struggling computer whiz is hungering for the cast-off old PC XT in my closet, the 1200-baud modem, and the perfectly functioning, but noisy daisy-wheel printer. The problem is finding them. I remember visiting pawn shops in the USSR where Commodore 64, Atari 800XL, and even Timex Sinclair computers—systems that an American would be ashamed to use as doorstops—were commanding big roubles. One man's junk is another's treasure.

These days, with computer prices dropping by the month, the cost of a classified ad nearly exceeds the value of functional but no longer fashionable computer gear. Unlike used cars, used PCs don't get traded in. They gather dust on desks, in closets, and on warehouse shelves, or linger for several years on the books as a tax depreciation.

With the end of the tax year looming, consider giving your old system to charity. Computer generosity is not limited to big corporations. Small businesses upgrading to new equipment, and individuals with a single peripheral lingering in the closet can help, too.

To find worthy charities, first turn to your own backyard for local schools, churches, or nonprofit organizations.

CASE HISTORY: PHONES FOR SCHOOLS

When Charlie Riley attended a school board meeting in Santa Clara, he learned that one of the top budget priorities of his daughter's school was a phone system that could cost $25,000 to $50,000.

Riley, staff manager of corporate business systems for National Semiconductor, went to his company to borrow some cellular phones for a few months for the school.

But when other company executives learned of the school's need, they quickly decided to provide an AT&T Merlin phone system they didn't need because of the consolidation of several smaller offices. When AT&T said it would charge $13,000 to wire the system, National decided to do the wiring as well. To help the school over any start-up problems, National bought a one-year maintenance agreement.

> **The value of the contribution is based on "the fair market value at the time you gave it." Donate it today, when the fair market value is at its highest, rather than waiting until it depreciates completely.**

For less than $10,000, National was able to provide to teachers of their employees' kids—and of potential future employees—a phone system that would have cost about $50,000 new.

This collaboration could be copied throughout Silicon Valley as firms consolidate offices or update systems. Equipment too old for corporate needs might be adequate for schools or nonprofits.

TAX BENEFITS

If you donate gear to a 501 (c) (3) nonprofit charitable organization, the IRS allows a tax write-off on your next return. Depending on your tax situation, a contribution could reduce your taxable income for the value of the item. Not only would this reduce your taxes, but, for a substantial gift, it could even bring you into a lower tax bracket, reducing your taxes further.

According to the 1992 IRS tax guide, you may deduct "contributions or gifts to organizations that are religious, charitable, educational, scientific, or literary in purpose. Contributions may be in cash, property, or out-of-pocket expenses you paid to do volunteer work." The value of the contribution is based on "the fair market value at the time you gave it." Donate it today, when the fair market value is at its highest, rather than waiting until it depreciates completely.

NEW HOMES FOR OLD MACHINES

While most larger nonprofit organizations require new state-of-the art donations from Apple, Hewlett-Packard, and IBM to meet their number-crunching needs, some non-

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Giselle Bisson is a San Francisco-based free-lance writer who has contributed her writing and publicity skills (but so far, no hardware) to nonprofits. You can reach her at: gigibisson@aol.com.

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Dan Gelinas
Family Debt Arbitration Counseling Services
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profits happily accept older gear.

"We may be able to repair defective items, so we are even interested if your donation is in need of repair," Dan Gelinas says. A board member of Family Debt Arbitration and Counseling Services, a New Hampshire nonprofit charitable organization which provides credit counseling and debt relief programs for those in financial distress, Gelinas placed pleas for older equipment on America Online. In order to expand services to other communities, FDAC needs computers, printers, peripherals and software, a fax machine, as well as other office equipment and supplies.

Regardless of condition, your gift will have far more value if it is accompanied with a donation of help to set up and train users. "The mere act of donating an old system can often create as many problems as it solves," says Daniel Ben-Horin, executive director of CompuMentor, a San Francisco-based nonprofit that enlists the energies of computer professionals as on-site mentors to nonprofit organizations. "Often these old machines serve as doorstops because a nonprofit is too 'embarrassed' to admit that it has accepted a lemon and doesn't know how to get help.

"Nonprofits who accept older systems should make provisions for support and service. If a company wants to make a practice of donating old machines, it really has some responsibility to bundle its donation with the provision of support and service," Ben-Horin says. "Of course, few donors want this added responsibility."

"The new systems have more capabilities, and that means more configuration. The old systems have fewer capabilities, and that still means more configuration," says three-year CompuMentor volunteer and Windows consultant Barry Seymour. "The equipment in most nonprofits is modest, and so are their aspirations. They're very grateful to get what they can out of an old computer.

"It feels good when something is your area of expertise and you can go in and just ace it," Seymour says. "It's not just help. It's helping in an area you're really, really good at."

EAST/WEST

Some nonprofits are willing to take the risk of older equipment donations. When Ethel Dunn, a Russian specialist with cerebral palsy, learned of a struggling group of disabled women in St. Petersburg, Russia, she formed a nonprofit organization, Bumerang. She named it after the Russian spelling of "boomerang" because, "If you throw something good out, something good will come back."

"The situation is beyond words bad," Dunn says. "They don't have bed linens, shoes, clothes; it's hard to find money, even for the bus. Their pensions haven't kept pace with inflation. I don't think capitalism has done much for them; a lot of people are falling through the cracks in a new system."

Computer equipment would help the women earn money doing word processing for firms trying to establish contacts with Western partners. A laser printer

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Tri-Segment Stackable 24 ports	1,230
Tri-Segment Stackable 24 ports w/ SNMP	1,932
Tri-Segment Management module (STMDB)	836
Token Ring Module	1,159
NetWare App. Engine w/o NetWare Runtime	3,026
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Hubview SNMP mgmt. software (Windows)	950
SYNOPTICS 2803 16 ports w/AUI	808
2804 16 ports w/Fiber Optics	1,177
2814-04 16 ports	2,135
2814-05 16 ports	1,693
3000N 12 Slot Chassis	1,814
3308A 12 Port module	1,182
3314A-03 Mgmt. module w/ basic SNMP	2,064
3314A-04 Mgmt. module w/ advance SNMP	3,266

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TUTANKHAMON Long Distance Repeater. Link 1500' using one pair of TP cable, alternative to fiber, Requires 1 Pair	1,446
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DJ-20 250MB Int. Tape Drive	192
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JTC-20 250MB TRAKKER Para. Port Tape Drive	375
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Power Tape Ext-25 2 GB SCSI Tape Drive w/Ctrl.	1,251
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Lan WorkPlace for MacIntosh (Single User)	290
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NetWare NFS Starter Kit	1067

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ALLIED TELESIS Local Ethernet Bridge w/ SNMP	1,739
NOVELL MultiProtocol Router 2.0	721
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NetBuilder Token Ring	4,736
NetBuilder Remote (Thick/Thin)	5,263
INTELLICOM Enet Local, 2AUI,2BNC,SNMP	1,300
MADGE 16/4 Token Ring Bridge	2,051
PROTEON DNX 300i Token Ring to Token Ring	4,162
DNX 300i Token Ring to Ethernet	4,162
DNX 300i Token Ring to Dual Series	4,919
RETIX 4850 Remote Bridge	3,575
SYNOPTICS 3323S Enet Local Bridge w/AUI	2,874
SYNOPTICS 3522 Token Ring Bridge	5,677
UDS DDS/MR1 RS232 or v.35 w/interface	589

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ARTISOFT Central Station	431
BRIGHTWORKS NetRemote+(100users)	359
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MICROTEST Token Ring LANModem	2,050
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SHIVA NET MODEM/E 9600 BNC	1,567
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Inoculan (20/250 workstations)	326/655
Utils for NetWare 286/386	257
CENTRAL POINT Anti-Virus NLM for NetWare 3.11	890
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FRYE NetWare Management	339
Early Warning System	339
Lan Directory	339
INTEL LanDesk Manager v 1.5 (*New Version*)	1,070
SYMANTEC Norton Admin. 5/10/25/50/100	247/438
SABER Lan Workstation 1st node/add 1	159/39
MICROTEST Lan Assist	210
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NOVELL LanAnalyzer for Windows v2.0	1,055
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XIRCOM Network Simplicity Starter Pack	427
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tops Dunn's wish list, but the group will accept any Macintosh-compatible printer that can reproduce the Cyrillic alphabet.

The East West Foundation takes old equipment and distributes it to American schools and colleges and to democratic and educational institutions in Eastern Europe, the Commonwealth of Independent States, and Latin America, with the goal of "fostering free government, free speech, and a free market economy." East West also donates hardware and expertise to American schools, focusing on building international bridges of understanding.

"Eighty-five percent of American school children do not have access to computers. Independent journalists in the emerging democracies of Eastern Europe are hindered with ancient technology," says Executive Director Dr. Alex Randall. "What is freedom of the press without the pre-press?" East West will even accept and refurbish nonfunctioning, antiquated hardware and components (such as monitor cords). "We call it Silicon Ecology," says Randall.

HISTORICAL COLLECTIONS

The Historical Computer Society, a nonprofit group of enthusiasts of "antique" computers, might find a fascination with your dinosaur. David Greelish, founder of HCS, takes the collection to schools to teach the history of computing, and publishes *Historically Brewed*, a newsletter for old equipment buffs.

The collection started with his first computer, an Apple Lisa, and now includes a Commodore PET, a Commodore SX 64 portable, a Timex Sinclair, a TRS-80 Model 4, a Coleco ADAM, and a four-foot tall 1970s-era BASIC 4 minicomputer.

While he's heard rumors of original Apple motherboards selling for $50,000, the problem with old computers is that "They're not really worth anything," Greelish says. "I think every day, they're getting more rare. They're going to disappear eventually."

Another collector looking for VDTs, Altairs, IMSAI, Heath/Zenith, Intertec, Cromemco, Radio Shack, Apple, Ohio Scientific, and DEC PDPs posted a plea on America Online, and can be reached at *DaBex Co@aol.com.* ■

IF YOU ARE INTERESTED IN DONATING hardware and software, or bringing your computer skills to a nonprofit organization, CompuMentor is currently looking for volunteers with the following skills: Mac/Windows database design, training, advanced features, basic training on "Works" programs. (Claris, Microsoft, etc.), troubleshooting, utilities, Mac/DOS program management, strong computer users good at phone diagnosis of common system problems, Windows setup and use, hardware upgrades. (DOS, Mac memory, drives, video.) Call (415)512-7784 for more information.

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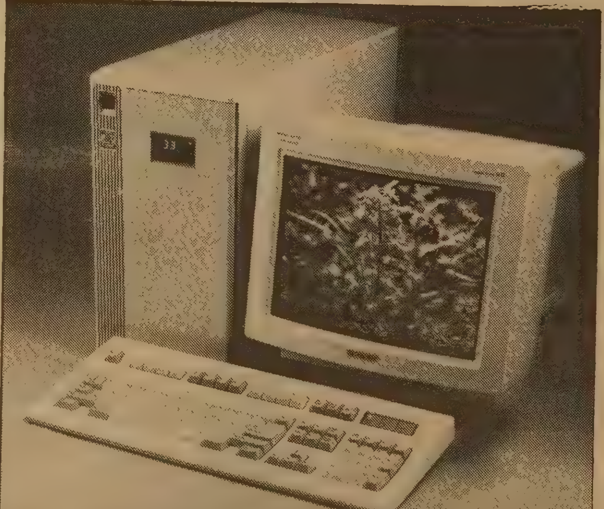

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RECYCLED COMPUTERS

By Paul Winternitz

"A million computers a month are thrown away in America," says Mark Hass, as he stands in front of racks and racks of outdated PCs. "In a year, we throw away enough computer technology to handle all the computer needs of all our K-12 schools." Hass, the executive director and founder of the Computer Recycling Center in Mountain View, wants to make sure at least some of these computers are given new life as educational tools for students throughout Northern California.

Founded two years ago, the CRC is still growing at an exponential rate and in October of this year relocated to a new building with 20,000 sq. ft. of office and work space; and in the last ten months its staff of 150 volunteers have the impressive track record of placing over one thousand refurbished computers with appropriate software in schools and nonprofits across the Bay Area.

As technology leaps from the 286 processor to the 386 processor and then again to the 486 processor, companies who want to keep their workforce's competitive edge have been the major source for donated equipment. In the past this equipment was often stored in the hope that some future use could be found for it. However, with the current recession the price of even off-site storage is now exceeding the potential usefulness of these machines, and companies are looking for a place to unload their high-tech castoffs.

Unlike some of the other nonprofits doing similar work, the CRC does not hold anyone else responsible for support and repair services. Hass, who got his degree in MIS, first makes sure that all the equipment going out CRC's door is in top-notch running order. Secondly, he is dedicated to keeping the computers up and running once they are in the schools and follows up each donation with free support and a reasonable $39-per-hour repair service.

In true start-up fashion, Hass launched the CRC with his own money and a $2000 loan from a friend. Fortunately, a generous $20,000 Presidential grant from the David Packard Foundation soon followed. However, Hass wants to avoid being dependent on outside support and ideally would like the CRC to be self-funding. To generate income Hass has already landed a contract with National Semiconductor to teach basic hands-on troubleshooting techniques.

"We want to give people the skills to take care of themselves," like "installing a mouse, changing a floppy disc drive, and doing basic diagnostics," thus freeing up the MIS people for higher-level jobs.

Currently there are over forty million PCs in America. If one takes a peek into the immediate future, the need for organizations like the CRC becomes painfully obvious. Hass hopes that the hands-on, do-it-all approach he has built into the Computer Recycling Center can serve as a template that will be replicated across the country. ■

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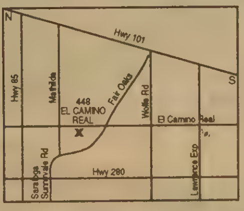

Memory Managers For DOS And Windows

Third-Party Vendors vs. Microsoft's MS-DOS 6

BY LENNY BAILES

Now that the 640K barrier has been broken for good, MS-DOS memory management has become a complex task. With MS-DOS 5, Microsoft began to get a message about what users expect in an operating system. MS-DOS 6 continues Microsoft's attempt to simplify memory management techniques.

The new MemMaker feature included in DOS imitates the automatic 386/486 memory management popularized by third-party vendors Quarterdeck Office Systems and Qualitas, Inc. Today's DOS users have lost the motivation to fiddle endlessly with system configurations. They're tired of playing video games just to get their software up and running.

The release of MS-DOS v6 early this year precipitated a new round of upgrades from third-party memory manager vendors to keep pace with Microsoft and with developers of DOS application software. Current releases from the Big Three in memory management offer support for disk compression software, compliance with Microsoft's DPMI memory standard, and more efficient management of DOS's 1MB address space.

Both Microsoft's MemMaker and the third-party memory managers presently make aggressive use of a PC's memory in the area between 640K and 1MB. This, in turn, frees up valuable memory in the "conventional" address space below 640K. In the process of shoehorning device drivers and resident programs above 640K, your memory manager reboots the machine several times, automatically modifying your config.sys and autoexec.bat. In DOS 5, you had to perform this process manually, or else add one of the third-party memory managers to do the job for you.

This year's memory managers share some common improvements: they are all easier to install, and they provide more support for programs that use DOS's upper memory address space. Since DOS 6 includes Doublespace (a compression program to free up hard disk real estate), the third-party products have all added support for it. Device drivers for disk compression can run smoothly without occupying conventional memory. The DOS system files can now also be loaded above 640K. Furthermore, the interfaces for all of the memory managers have become less cluttered and they offer new support for Windows (and other extended memory applications).

NEW IN DOS 6

The MemMaker feature included in MS-DOS 6 can automatically load many programs into upper memory blocks (UMBs). MemMaker allows DOS combat veterans to name specific UMB addresses for loading programs, and lets you choose which programs to load high.

While this is an improvement over the support offered in DOS 5, it still requires the user to have some highly technical knowledge. If you are a Microsoft Windows user on a non-networked, single PC, you can probably get by without this knowledge. If you run DOS applications and have only a few special utilities and device drivers to load at startup, MemMaker will probably take care of your needs. You won't need to look beyond the basic, automatic installation.

The MemMaker program includes safeguards for preserving system configuration in case of failure, but it won't optimize memory as well as the third-party products. MemMaker does not arrange code to best advantage in UMB blocks. Some programs and TSRs (exploding device drivers) require more memory on initialization than they do after becoming resident. As a result, MemMaker may be fooled, and load these programs into conventional memory. The packages offered by the third-party vendors know how to place exploding device drivers in upper memory.

If you are a power user with many preliminary programs to load, or a power user on a network, you may find that DOS 6 requires time-consuming tinkering and tweaking to get you up and running successfully. Two new options for the DOS 6 MEM command help you to see how DOS is handling memory allocation: MEM/Free shows unused UMB and conventional areas and lists their hexadecimal addresses. MEM/Module is a technical option that can show memory space occupied by individual programs.

HELIX NETROOM

Netroom is the memory manager you want to investigate if you deal with a memory-hungry network like Banyan Vines. Its new "Cloaking" technology makes more UMBs available for loading drivers than any of the other packages. Netroom includes its own software BIOS that replaces the ROM code hardwired in your PC. Because Netroom moves operating system instructions into extended memory, it delivers faster performance on some primitive tasks than the other packages.

Version 3 of Netroom has some notable improvements over the previous release. The installation program is now very user-friendly, providing easy access to advanced features. Augmented Netroom features in the current release include a fast disk cache, a ramdisk, and a set of screen savers. These goodies can all be added to your system without expending any conventional memory.

RESOURCES:

Netroom v3.02, $99.95
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386MAX v7.01, $99.95
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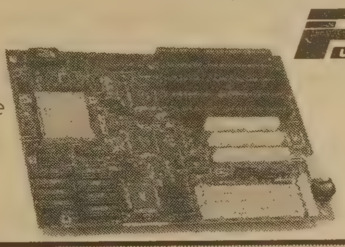

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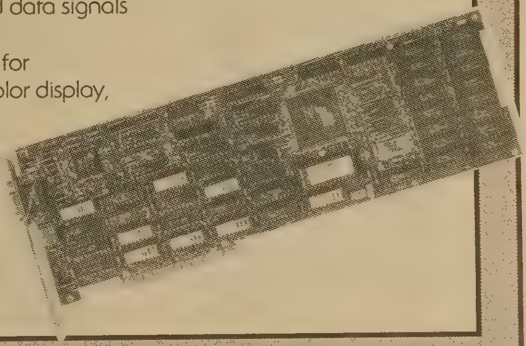

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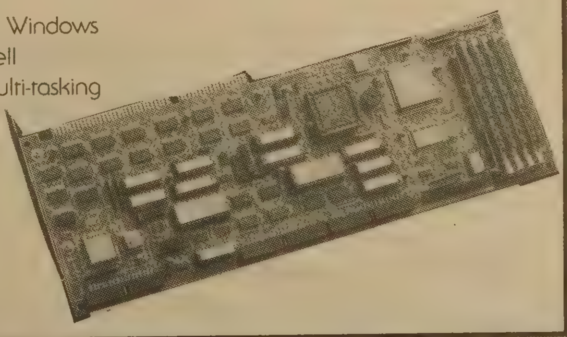

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Netroom's "Customize" and "Discover" utilities are both more user-friendly than they were in v2. The memory configuration process is also more reliable. "Discover" is still not as cosmetically attractive as Quarterdeck's "Manifest" utility, but it is improved.

Netroom's Customize offers three choices for system setup: conservative (most hardware compatible), aggressive (tries to free more memory), and custom (configurable by the user). During installation/setup you may select the ramdisk, the disk cache, and some other minor system defaults. (According to CEO and Chief Programmer Mike Spielo, choosing Netroom's internal STACKS feature may improve system functioning with Novell network software.)

In my tests Netroom provided slightly less conventional memory than Quarterdeck's QEMM, but had more room left over to load drivers above 640K. This means that Quarterdeck's product did a better job of moving common utilities and DOS system code out of the conventional address space, but if I had had even more programs in my autoexec.bat and config.sys, eventually Netroom could have yielded a higher conventional memory total. Netroom adds lots of auxiliary programs to autoexec.bat and config.sys. It makes your configuration files look cluttered, but it does the job of managing the placement of drivers.

Because the Netroom BIOS is a replacement for the one built into your system, some incompatibilities may arise. When I tested Netroom on my system, I discovered I had to return to my original video BIOS to solve some minor problems with the system's graphic cards.

I found overall system speed in working with applications to be roughly equivalent with all three memory managers, but Netroom registered slightly faster than QEMM on memory read/write operations as tested on QEMM's own Manifest. (Another set of benchmarks from *PC Week* showed QEMM to be faster in managing some primitive system functions, but Netroom turned out to be generally faster upon repeated testing.) The best test in this regard is still how well the memory manager works with the software you're actually going to be using for your day-in, day-out computing tasks.

Netroom's documentation is still a little disorganized, since they've added an "update" manual to the one included with v2. Netroom's new features are all detailed along with notes for managing disk compression software (DOS 6's Doublespace, Stac Electronics' Stacker, and Addstor's Superstor). Helix does provide a list of all files and programs included on the distribution disk, which is helpful for system troubleshooters. It would be a happier world if more software companies emulated this practice.

◆

Today's DOS users have lost the motivation to fiddle endlessly with system configurations. They're tired of playing video games just to get their software up and running.

◆

QUALITAS 386MAX

Qualitas 386MAX v7 adds one or two new features to its user-friendly interface. This is the package to get if you want your software to "talk" to you in right-brained, ordinary English.

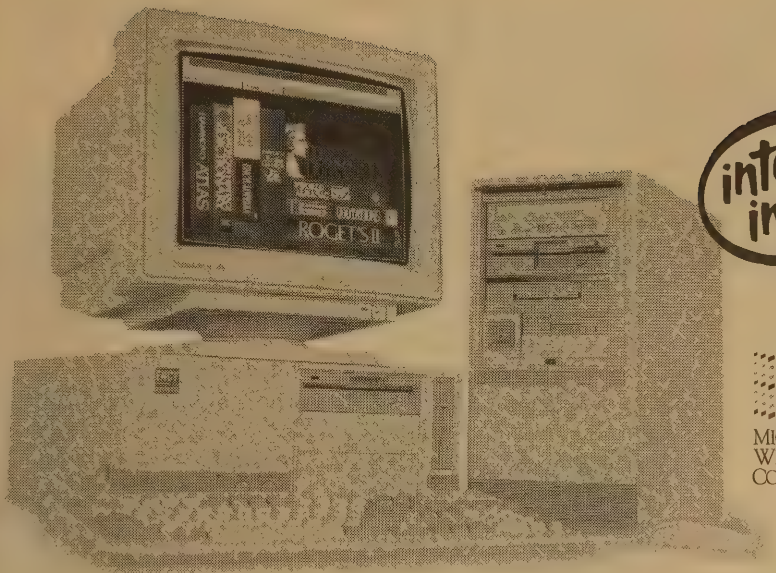
Like the other two packages, 386MAX offers optimization support for DOS 6's multi-config.sys feature. If you've modified your config.sys to include branching setups for alternate computer sessions, 386MAX can go through each setup, optimizing program loading for all of the sessions. Version 7 of Max also offers new support for running DOS sessions inside of Windows, permitting 736K of memory in a window for text-based applications. A special PIF editor replaces the one Microsoft bundles with Windows.

The Qualitas PIF editor is designed to make setup of DOS applications under Windows considerably easier. Their Windows support is the most seamless of the three third-party vendors. The designers at Qualitas have consistently favored simplicity and ease-of-use in their memory management products; however, the issues involved in cutting-edge memory management for DOS have strained them a bit.

386MAX does not shift upper memory around in the same way as Netroom or QEMM. The Qualitas programmers feel that overall reliability is gained by avoiding some of the complexities of the other packages. Yet even with their simpler approach to handling upper memory management, some incompatibilities and problems may arise with the automatic optimization (or "Maximization") of the system.

Max's install and configuration procedure has become the lengthiest and most convoluted of the three. Max must be installed with the write-protect off on the installation diskette, so a wise user should make a backup copy before proceeding. Maximize, the Qualitas optimization utility, reboots the system several times, checking the upper memory areas on your PC for available memory space. On the second pass, if the user chooses, a pop-up screen will display the autoexec.bat and config.sys, allowing a toggle between loading programs high or loading them into conventional memory. The Maximize help screens explain what the system is doing at each stage of the process, which may be an educational experience for a new user. (The quick mode performs the process without requesting user input.)

MAX v7 also includes QMT, the Qualitas Memory Tester. This little utility automatically checks the memory chips on your system, watching for unstable or defective RAM.



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Maximize yielded a fair amount of conventional memory on my 8MB 486 system (591K without Doublespace loaded and 572K with Doublespace). This is not as much memory as QEMM and Netroom produce, but it should be adequate for nearly all DOS software.

386MAX contains a new "virtual DPMI" feature. Just as Windows establishes a swapfile on the hard disk to create more application memory, the virtual swapfile in 386MAX performs a similar function for other DPMI-aware programs. If you run Lotus 1-2-3 v3 and up, this Max feature can provide extra "virtual" memory for your spreadsheet calculations.

The Qualitas PIFeditor included with 386MAX will be a boon for users who want to customize their DOS applications under Windows. The Qualitas PIFeditor is organized logically, making it easier to understand an application's setup requirements. Qualitas's DOSMAX feature is also built into the PIFeditor. Just clicking a button can free up to 96K of extra memory for text-based DOS applications. (You can configure Windows to do this with the other two memory managers, but it takes a lot more work.)

I found 386MAX had difficulty installing correctly with Hyperware, Inc.'s Hyperdisk, a fast and worthy disk cache. The disk cache included in the Max package has not been updated since the last version. DOS 6 users who stick with Microsoft's Smartdrive should have no installation problems. A problem with removing the memory manager files from a rival package is reconciled in a patch that should be distributed shortly.

QUARTERDECK QEMM

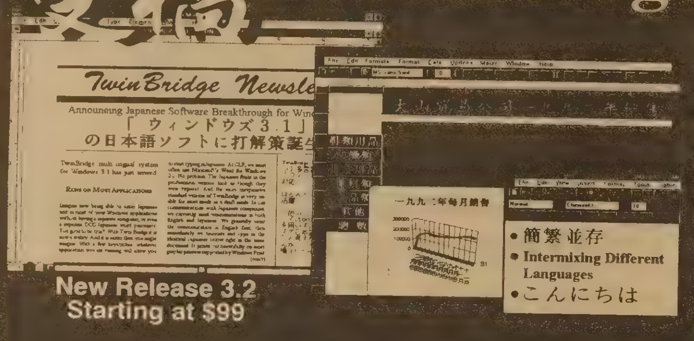
Quarterdeck's QEMM has been the industrial strength PC memory manager since its inception in 1987. I've found it consistently offers the most trouble-free performance, and produces the smoothest performance with all my PC software. Additionally, QEMM is designed to work with Quarterdeck's DESQview, a multitasking system for PCs that antedates Windows and delivers faster, steady performance on lower-cost, lower-RAM hardware.

Version 7.01/02 of QEMM offers the same improved management of the DOS command kernel and disk compression support as the other two leading third-party products. QEMM has traditionally been the product that required more study to invoke powerful advanced options. In v7, the setup and optimize features have become more user-friendly. The new QSETUP program can automatically manage Microsoft's Doublespace, freeing up more conventional memory than any of the other products. (My system gained 30K.) The special QEMM Doublespace driver replaces the one included with MS-DOS 6. It creates more conventional memory, but may slow down disk reads on compressed drives by as much as 50%.

The advantage to the new QSETUP and Optimize features, however, is the speed and efficiency with which they operate. Users can now choose whether to load DOS high or low, configure DPMI memory management, or access a series of QEMM hints and techniques.

You may also review the QEMM command-line parameters affecting pageframe and UMB mapping without rerunning the entire installation process. (Netroom has a similar feature.)

There were also difficulties reported between QEMM v7.0 and DOS 6's Smartdrive. Version 7.01 was sent out to reconcile this. A conflict with the Quarterdeck Doublespace driver and the Intel Satisfaxion board's drivers in v7.01 is corrected in maintenance release 7.02. ■



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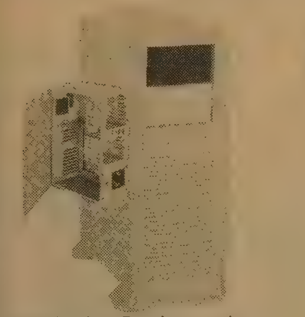

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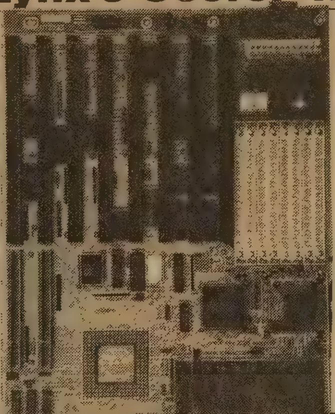

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(U.K.)

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$139 (Local Bus)

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• Removable IDE HDD Kit	$36
• TOUCH/Arche/MRI 14" SVGA .28 Monitor Int/Non-Int	$239/259
• ADI MicroScan 3E/3G/4G(15")/5A (17") NI Monitor	$299/335/425/825
• NE-2000 Ethernet Card Coax/Twist-Pair	$57/62
• Full Tower Case w/220W PS (42T)	$80
• Mini/Med Tower w/230W PS (104T/106T)	$49/75
• MGC 15" NI SVGA Monitor (1280x1024)	$379
• NANAO F550i FLEXSCAN 17" (2nd)	$875
• NEC 4FGe/5FGe	$679/1195(Limited Quantity)

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Mono 12"/14"	$75/94
ADI MICROSCAN 3E (1024X768 .28 NI)	325
ADI 3G/Low Rad	335
ADI 4G 15" 1280 SVGA	445
TOUCH 14" SVGA .28 Monitor Int/NI	239/269
NANAO 9070U/9080i (16" 1024X768 .28)	955
NANAO F550I (17" 1280X1024 .28)	1075
NANAO F560I (17" 1280X1024 .25)	1690
NANAO T660I (20" 1280x1024 .31 NI, Trinitron)	2585
NEC 3FG/4FGE (15" 1024X768 .28)	589/685
NEC 5FGE (17" 1280x1024 135MHz)	1195
NEC 6FG (OEM) (21" 1280x1024 135MHz)	2385
SEIKO CMI 2070 (1280x1024) .25	1999
SEIKO CMI 2050 (1024X768 .31 NI)	1495
SONY 1304S (14" 1024X768 .25 NI)	595
SONY 1604S (OEM) (17" 1024X768 .25)	965
SONY GDM 2038 (20" 1280X1024 .30)	2295
VIEWSONIC V15	545
VIEWSONIC V6E (14" 1024X768 .28)	315
VIEWSONIC V6FS (15" 1024X768 .28)	575
VIEWSONIC V17 (17" 1280x1024 .28)	1125
VIEWSONIC V20 (20" 1280x1024 .31)	2295
MGC 15" 1280 NI	399

KEYBOARD, MOUSE & SCANNERS

MaxiSwitch/KeyTronic 101 Keyboard	$34/34
OMNIKEY 101 NI/102/ Ultra	69/79/99
LOGITECH MouseMan Ser/Bus NEW	59/62
LOGITECH TrackMan Ser/Bus /PT	72/79/99
MicroSoft Mouse Ser/Bus	69/79
Handy Mouse	10
Microsoft DOS 6.0/Microsoft Windows 3.1	45/49
Focus FK 9000	65

MODEMS

2400 bps Modem Int/Ext	$32/68
2400 bps Data+9600 bps Send/Recv Fax Int Modem	65
Hi-Speed 14400 Fax Modem	159
9600 V.32 + MNP + V.42 bps Int/Ext Modem	285/399

CONTROLLERS

DC-600B Cache IDE ISA	$125
DC-680 Cache IDE VLB	149
DC-620 Cache IDE EISA	199
DC-820 Cache SCSI EISA	385
Adaptec 1542C w/o kit	195
IDE VLB Add-On	45
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IDE 1:1 2HD/2FD & 2S/1P/1G W/Cable	16
IDE 1:1 2HD/4FD Controller	45
AT 1:1 MFM 2HD/2FD Controller	45
Serial (RS232) Card/Parallel (Printer) Card	13/14

LOCAL AREA NETWORKS

Ethernet NE-1000/NE-2000 Coaxial	$55/65
Ethernet NE-1000/NE-2000 10-Base T	58/69
ARCNET 8/16 Bit Coaxial Star	41/64
ARCNET 8/16 Bit Twisted Pair	47/74
MAXLANStarter Kit (8 bit/16 bit)	185/199
LANtastic AE-2/AE-3 Starter Kit	479/549
LANtastic AE-2/AE-3 Adapter	219/249

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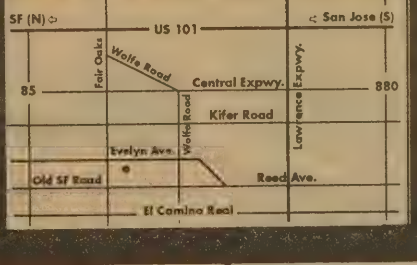

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ACCESS' high-speed machines provide exceptional performance and flexibility for long-term business needs. Delivers multi-tasking capabilities for easy handling of simultaneous applications.

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- ◊ 256K Cache, 0MB RAM exp. to 32MB
- ◊ AMI BIOS
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- ◊ Real-time clock/calendar
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Access VLB 486DX-33

- ◊ 256K Cache, 0MB RAM exp. to 32MB
- ◊ AMI Bios
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- ◊ Real-time clock/calendar
- ◊ 5.25" 1.2MB floppy drive
- ◊ 101 Enhanced keyboard
- ◊ Deluxe Desktop or Medium Tower
- ◊ 1 year parts & labor warranty

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Access 386DX-33

- ◊ 128K Cache, 1MB RAM exp. to 32MB
- ◊ AMI Bios
- ◊ 2 serial/parallel/game ports
- ◊ IDE hard/floppy controller
- ◊ Real-time clock/calendar
- ◊ 5.25" 1.2MB floppy drive
- ◊ 101 Enhanced keyboard
- ◊ Deluxe Desktop or Medium Tower
- ◊ 1 year parts & labor warranty

$339

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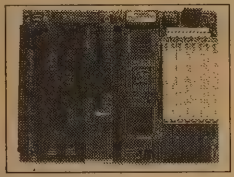
Motherboards

MicroStar 486DX2 VESA Local Bus



- ◊ Intel OverDrive Socket
- ◊ 256K Cache Memory
- ◊ 2/3 VESA Local Bus slots
- ◊ Upgradeable to 32MB
- ◊ 16-bit AT bus slots

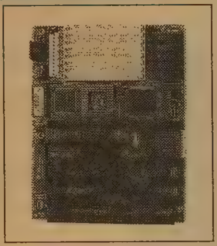
Call for CPU Prices!

DX2-50	$129.00
DX2-66	$139.00

386DX-40MHz Motherboard w/ CPU

Manufactured by **Silicon Star**

- ◊ 80386DX-40 processor
- ◊ 128K Cache memory
- ◊ AMD CPU
- ◊ 0MB exp to 32MB

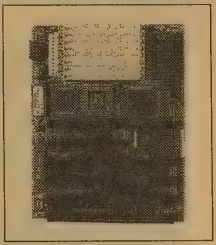


$99

486DX-33MHz Motherboard w/ 64K Cache

Manufactured by **Silicon Star**

- ◊ 486DX-33 processor
- ◊ 64K Cache memory
- ◊ 6 expansion slots
- ◊ 0MB exp to 32MB



$69

Access 386DX-40

Mini Tower System

Affordable System

- ◊ 128K Cache, 1MB RAM exp. to 32MB
- ◊ AMI Bios
- ◊ 2 serial/parallel/game ports
- ◊ IDE hard/floppy controller
- ◊ Real-time clock/calendar
- ◊ 5.25" 1.2MB floppy drive
- ◊ 101 Enhanced keyboard
- ◊ Deluxe Desktop or Medium Tower
- ◊ 1 year parts & labor warranty

$339

IBM 486SLC-50MHz

Basic System

Made in USA

Manufactured by IBM

- ◊ IBM 486SLC-50MHz CPU
- ◊ Western Digital Chip Set
- ◊ 2 serial/parallel ports
- ◊ Built-in Window accelerator
- ◊ Supports up to 32MB RAM
- ◊ Internal 16K cache
- ◊ Built-in IDE HD/FD controller
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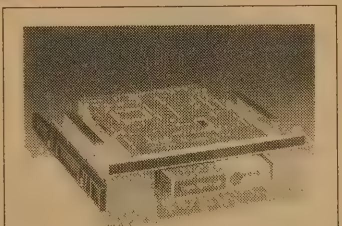

Internal:

DJ-10 120M
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JUMBO Internal:

Operates off Portable Port! Ideal for Notebooks!

DJ-10	120MB	99.00
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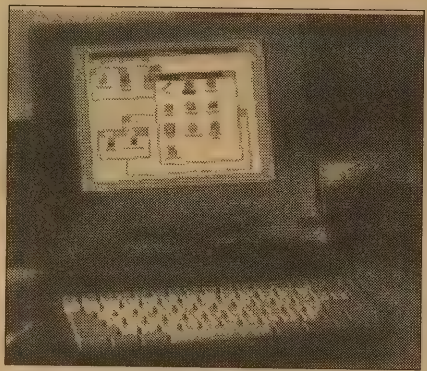

The smartest design ...
The smartest buy

The affordable, full-featured 486 notebook, weighs less than 6 lbs.

$1699

- ◊ 486SLC/33 MHz
- ◊ 120MB hard drive
- ◊ DOS, Windows
- ◊ WinFax & BitCom software
- ◊ Carrying Case
- ◊ 4MB RAM exp. to 8MB
- ◊ Logitech trackball
- ◊ Backlit LCD VGA
- ◊ 24/96 built-in Fax modem
- ◊ 1-year on-site service in US

EPSON ActionNote™ 4000 Sub-notebook

The unbelievably small, lightweight 486.
- **30% LIGHTER**
- **31% SMALLER**

$1599

- ◊ 486SLC/33 MHz
- ◊ 8MB removable hard drive
- ◊ DOS, Windows
- ◊ 1 PCMCIA II slot
- ◊ Carrying Case
- ◊ 4MB RAM exp. to 8MB
- ◊ Built-in 2 button trackball
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- ◊ External 3.5" floppy drive
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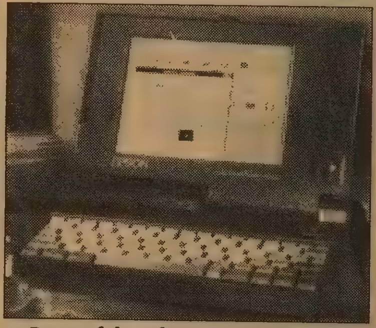
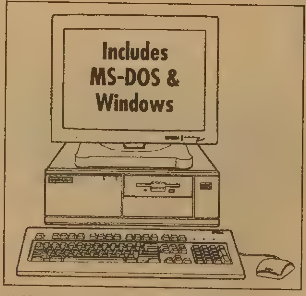


Powerful performance in a small package. Weighs less than 4 lbs.

Equity 4 Systems

Affordable High Performance



One-year On-site Warranty!

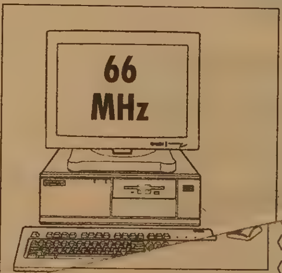
** Monitor not included*

- ◊ Support for Intel's OverDrive
- ◊ 512K video DRAM exp. to 1MB
- ◊ Zero insertion Force sockets
- ◊ 4 ISA 16-bit slots
- ◊ 4MB RAM exp. to 32MB
- ◊ 101 key keyboard & m
- ◊ 3.5" floating design

486SX [illegible]20MB HDD	$989.00
486DX-33 120MB HDD	$1189.00
486DX-33 240MB HDD	$1339.00

Progression 486DX2/66

Born to Run Windows...
The Fastest in its Class!



Monitor not included

- ◊ Intel 486DX2/66 processor
- ◊ Built-in math coprocessor
- ◊ Epson's VirtualCache™
- ◊ 3.5" 1.44 MB FDD
- ◊ MS-DOS, Windows included
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- ◊ Built-in 8KB cache
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Progression 4 Systems

Smaller footprint than Progression

486DX-33	120/240MB HDD	$899.00/1289.00
486DX2-33	120/240MB HDD	$1189.00/1619.00
486DX2-66	120/240MB HDD	$1339.00/1729.00

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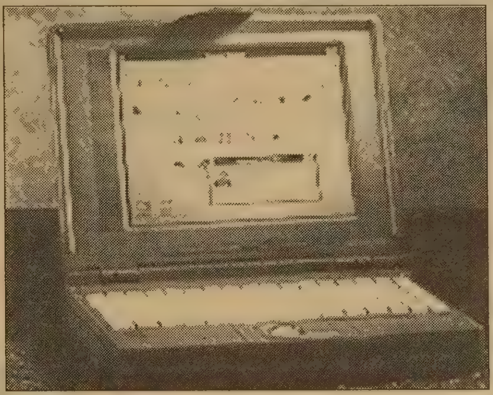
ACER Products

Acer



- ◊ MS-DOS 6.0
- ◊ Interlink transfer utility & cables
- ◊ Suspend utility
- ◊ MS-Windows 3.1
- ◊ Ultra VGA drivers
- ◊ 1 year 24-hour replacement in U.S.

Acer Note 730 486SX/25:

Mono 4MB RAM 120MB HDD	$1844.00

Acer Note 750 486SL/25:

Mono 4MB RAM 120MB HDD PCMCIA slots	$2087.00

Acer Note 750C 486SL/25:

Active Color 4MB RAM 120MB HDD PCMCIA slots	$3592.00
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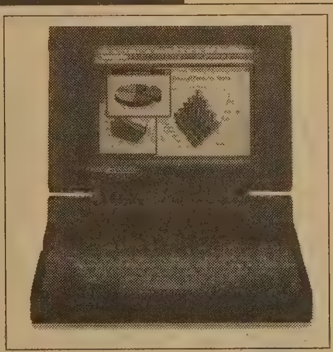
NEC UltraLite™ Versa 25C

NEC



Color 486SL
4MB RAM
180MB HDD

- ◊ Built-in Local Video Bus
- ◊ Two PCMCIA Slots
- ◊ Removable Screen & HDD
- ◊ Intel 486SL processor w/ 25MHz
- ◊ RAM exp to 20MB
- ◊ Brilliant color SVGA TFT active matrix display
- ◊ 64KB cache for enhanced performance
- ◊ Upgradeable to pen system
- ◊ Up to 5 hours of battery life

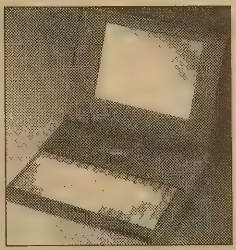
intel inside

Accessories Available:
- ◊ 14.4/96 Fax Modem
- ◊ 8MB Upgrade
- ◊ Docking Station
- ◊ Ethernet PCMCIA
- ◊ Standard Battery
- ◊ NiCad Battery
- ◊ Carrying Case

$3888

COMMAX

COMMAX



486
DX2-66

- ◊ Built-in trackball
- ◊ Built-in 3.5" FDD
- ◊ Docking station interface
- ◊ Phoenix BIOS
- ◊ 9.5" screen
- ◊ Full function keyboard

SMARTBOOK 486DX/33

Mono 4MB RAM 120MB HDD	$1829.00

SMARTBOOK 486DX2/66

Mono 4MB RAM 120MB HDD	$2069.00
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Active Color 4MB RAM 120MB HDD	$3669.00
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Fax Modem

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- ◊ MNP 5 & V.42 bis
- ◊ WinFax Lite™ fax software
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9600/2400 bps fax modems

Internal for PC	78.00
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Pocket faxmodem for PC	126.00

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Internal for Mac PowerBook	238.00
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Pocket faxmodem for PC	238.00

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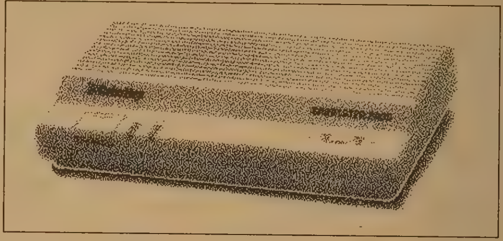
USRobotics®
The Intelligent Choice in Data Communications



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Sportster 14.4/14.4 Fax Modem

Internal	119.00
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Sportster 14.4/96 Fax Modem

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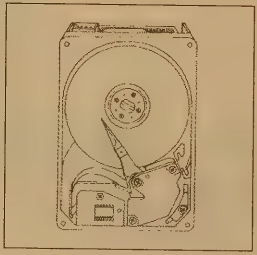
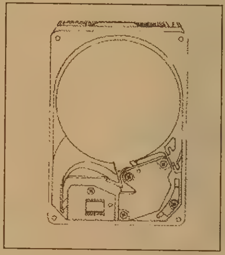
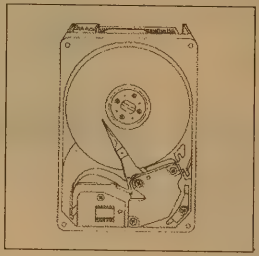
Reliable High-Performance Magnetic Drives to Meet Your Most Demanding Jobs!







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30174	174MB, 15ms	179.00
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7213A	213MB, 15ms	199.00
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7345A	340MB, 14ms	268.00
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7540SL	540MB, 8.5ms, SCSI	699.00
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1240S	1.2GB, 8.5ms, SCSI II	1149.00
17SM	1.4GB, 13ms, SCSI	1149.00

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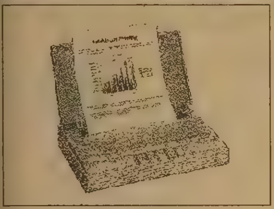
Canon

Canon BJ-5 Portable

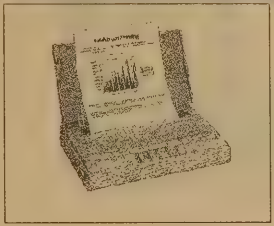

Unit is remanufactured

Identical to BJ-10ex!

- ◊ Prints up to 83cps
- ◊ Text and graphics up to 360dpi
- ◊ Uses plain paper & transparencies
- ◊ 90-day warranty

$149

Canon BJ-10ex Portable



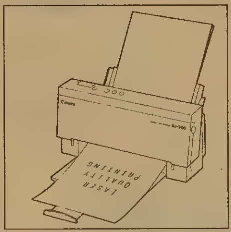
FREE Cut Sheet Feeder!

- ◊ Prints up to 83cps
- ◊ Text and graphics up to 360dpi
- ◊ Uses plain paper & transparencies
- ◊ 1 year warranty

$138

BJ-200 Desktop Bubble Jet

$30 Rebate



- ◊ Prints up to 248cps
- ◊ 100-page sheet feeder
- ◊ 7 resident fonts
- ◊ Hold up to 10 envelopes

$267*

** Price after mfg's rebate, thru 12/31/93*

LBP-430 Personal Laser Printer

Environmentally Friendly...
Toner recycling program & sleep mode for low power consumption

- ◊ 4 pages per minute
- ◊ 1MB RAM exp to 5
- ◊ PCL 5 compatibility
- ◊ 22 fonts-8 scalable fonts
- ◊ 2 year product warranty

NEW!

$599

BJC-600 Color

NEW

- ◊ 360 dpi
- ◊ 240cps draft, 170cps high quality
- ◊ 64 nozzles per color
- ◊ 16.7 million colors available
- ◊ 100-sheet ASF
- ◊ 2 year product warranty

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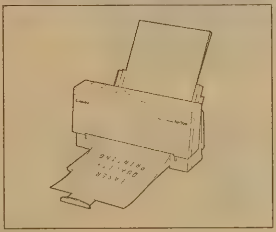


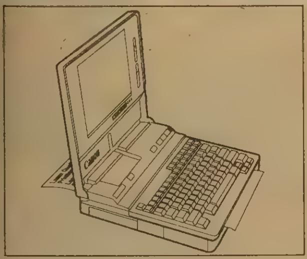
$30 Rebate

- ◊ Prints up to 248cps
- ◊ 100-page sheet feeder
- ◊ 110 column, wide carriage
- ◊ Hold up to 10 envelopes

$369*

** Price after mfg's rebate, thru 12/31/93*

Canon NoteJet 486


Entire system with battery weighs only 7.7 lbs.

Computer and Printer In One!

FREE Ink Cartridge
w/ Notejet purchase

486SLC-25MHz
4MB RAM
180MB HDD

Other Models Available

- ◊ Powerful Full-Featured 486 Notebook
- ◊ High quality Bubble Jet™ Printer Built-in
- ◊ 2 PCMCIA Expansion Slots
- ◊ Built-in 10 sheet Letter Feeder
- ◊ Preloaded DOS, Windows & NoteJet tutorial, and more...

$2799

Canon Innova 486NXM25

Fully Loaded!

NEW

486SX-25MHZ•4MB RAM•120MB HDD

- ◊ Powerful 486SX-25MHz
- ◊ 4MB RAM
- ◊ Fax Modem
- ◊ Built-in trackball
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TOSHIBA

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- ◊ 1.44MB 3.5" floppy
- ◊ Ball Point mouse included
- ◊ DOS, Windows
- ◊ Backlit LCD VGA
- ◊ 1 PCMCIA expansion slot
- ◊ Option security lock
- ◊ Advanced power management
- ◊ 1-year limited warranty

LEADER in Portable Computing

TI900™ 486SX Notebook

200MB Hard Drive Mono	$2189.00
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Avanti 025

New Affordable Color Notebook

- ◊ 486SLC-25MHz
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- ◊ Built-in 2 button trackball
- ◊ DOS, Win, Fax software
- ◊ Passive Matrix Color LCD
- ◊ Fax Modem Built-in
- ◊ Advanced Power Management
- ◊ Carrying Case
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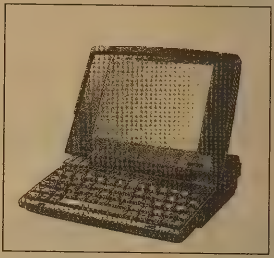

Avanti® 425C Notebooks

120MB HD, 9600 Fax/2400 Modem	$2199.00
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- ◊ Built-in trackball
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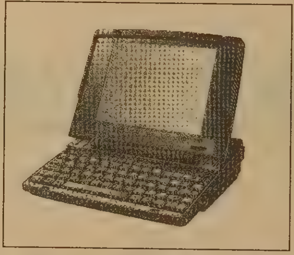

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OKI PHONES

- ◊ Store up to 200 phone numbers
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- ◊ Five NAMs for phone numbers
- ◊ Auto answer system
- ◊ Remote feature access capability
- ◊ Auto credit card calling
- ◊ Up to 60 min. talk time

Model #900 $469

- ◊ Retractable antenna
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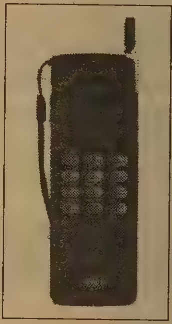
- ◊ Built-in jack for hands free usage
- ◊ Three NAMs for carrier service
- ◊ Two batteries included
- ◊ Three year warranty
- ◊ Data-capable for mobile office

Model #900 $569



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Handheld 8000-HX

The most popular handheld phone allows you to talk up to 90 minutes & keep up to 30 numbers!

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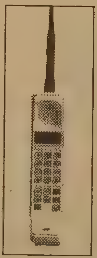
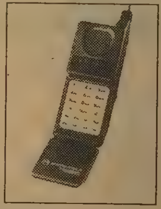


Flip Phone DPC-550

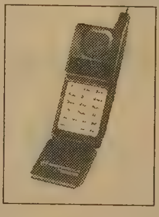
The most popular flip phone lasts up to 100 min. of talk time & 30# memory. Case & over night charger included.



$288

Flip Phone DPC-950 Base

Weighing only 9.9 oz, this phone is packed w/ features such as 101 alpha numeric memory, 100 min. talk time battery & charger!



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Micro TAC Lite Base

This 7.7 oz. phone gives you the state of the art performance: 45-min. talk time, 100# alpha numeric memory & charger.

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Ultra Lite with Vibra Call

The lightest phone available weighing 5.5 oz. 100# memory will vibrate to alert an incoming silently.

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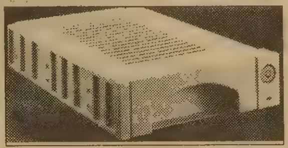
Fits all 3.5" IDE Hard Drives

Allows easy installation & removal of hard drives. The perfect way to protect & transport all your valuable data!



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#DSF005T

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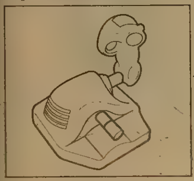
by BONDWELL



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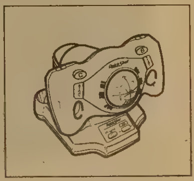

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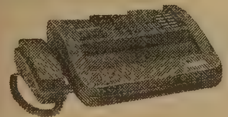

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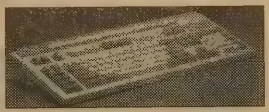

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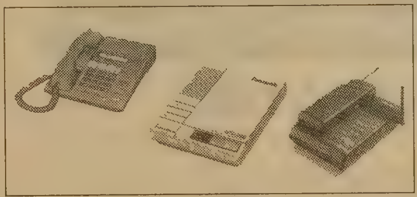

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  - • Photostyler SE
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  - • Where in the World is Carmen Sandiego
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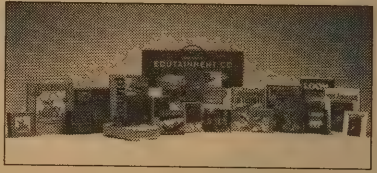

- ◊ Sound Blaster 16 Sound Card
- ◊ Internal CD-ROM drive
- ◊ Stereo Speakers
- ◊ Software:
  - • Toolworks Multimedia Encyclopedia
  - • The Animals
  - • Secret Weapons of the Luftwaffe
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- ◊ SONY internal CD-ROM drive
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Multispin Reader

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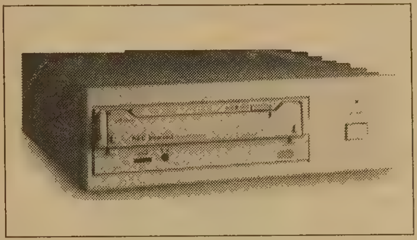

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Internal CD-ROM w/ IF.......... **$169**

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Bring the World to Your Senses	13
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Composer Quest	29
Compton's Family Encyclopedia MPC	37
Desert Storm MPC	22
Dictionary of the Living World	31
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Great Cities of the World vol. 1	22
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Guiness Book of Records MPC	25
Jet & Props	25
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Playing with Language Spanish	27
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Macromedia Action for Windows	34
Mantis Experimental Fighter	18
Mario Is Missing	25
MIDI Music Shop	22
Monkey Island	24
Multimedia Audubon's Mammals	18
Sherlock Holmes Consulting Det	19
Sleeping Beauty	22
So Much Shareware 1	14
Space Adventure	22
Sports Best	21
Stellar 7	26
The 7th Guest MPC	79
The Shareware Concept	17
Whale of Tale	87
Who Killed Sam Rupert	27
Wizard MPC	17
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Marketing Master 1992	21
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Q & A Symantec DOS 4.0	34

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Mayo Clinic Health Book	27
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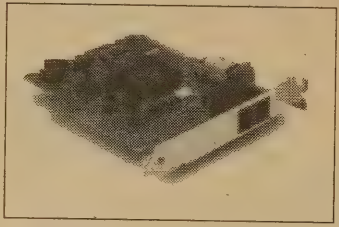

2400i Plus Internal Data Modem

- ◊ 2400bps
- ◊ RPI Based V.42 bis, MNP 2-5
- ◊ Easy-to-use Menus
- ◊ Includes Communications software
- ◊ 10-year Limited Warranty

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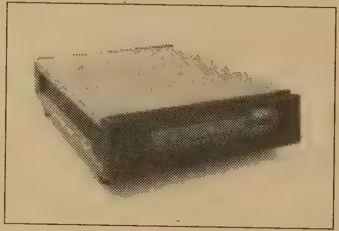

9648/24e External Fax Modem

- ◊ 9600/4800R-2400bps data
- ◊ RPI based V.42 bis, MNP 2-5
- ◊ CCITT T.30 Group 3 Protocol
- ◊ Includes Communication & Fax Software
- ◊ 10-year Limited Warranty

$39

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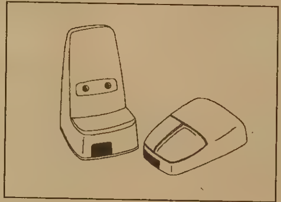
Z-NIX Cordless Mouse



- ◊ Save desk space
- ◊ No cord tangling
- ◊ Mouse Driver
- ◊ 2 rechargeable driver

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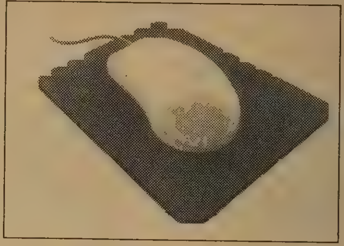
Microsoft Mouse

Fits the Way You Work - With Ergonomic Comfort

Mouse Pad 99¢



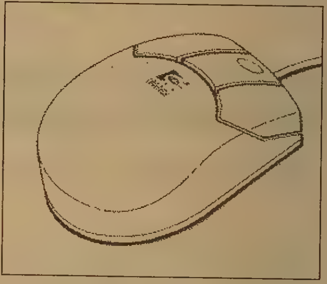
PS/2 version 89.00

$69.99 Serial Version

Logitech MouseMan™

LOGITECH

Serial PS/2 Mouse



- ◊ 400dpi resolution
- ◊ 3 programmable buttons
- ◊ Ergonomic design
- ◊ MouseWare utilities
- ◊ Windows 3.1 compatible

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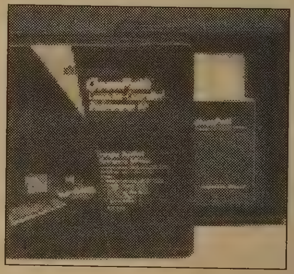
Computer Controlled Maintenance Kit



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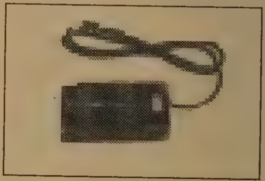
Surge Supression Module



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Four outlet (2x2) floor or table module filtering capability. 6-foot SJT insulated line cord. UL approved.

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Four outlet (2x2) protect computers & all audio/video equipments against surge.

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NANAO

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SAVE $150

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- ◊ .28 dot pitch
- ◊ Flat screen w/ Analog RGB input
- ◊ 1 year waranty
- ◊ Monitor is remanufactured*

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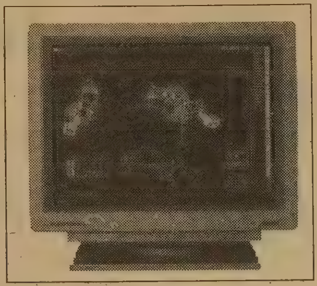

F550i

NEW

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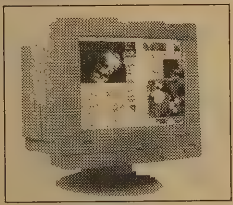

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NEW!

- ◊ 15", .28mm flat square CRT
- ◊ 1024x768 at up to 60Hz
- ◊ Energy Star compliance
- ◊ 3 year warranty

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SONY

1304s Non-Interlaced SVGA Monitor

- ◊ 1024x768 resolution
- ◊ .25mm dot pitch
- ◊ 14" Trinitron tube
- ◊ 28-50Hz Vertical Scan Frequency Range

$459

GDM-17SE1

- ◊ 1600x1200 max resolution
- ◊ .25mm dot pitch
- ◊ 50-150Hz vertical scan range
- ◊ Energy Star compliant

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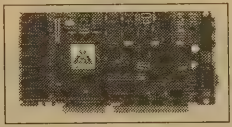

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Panasonic Office Automation OA

C1795E 17" SVGA Monitor

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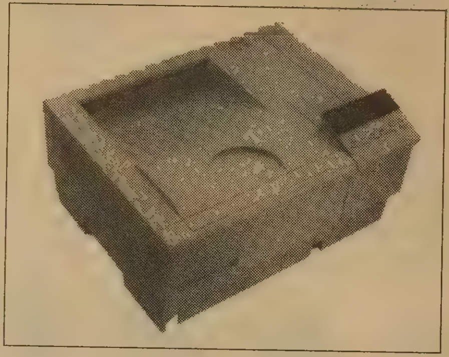

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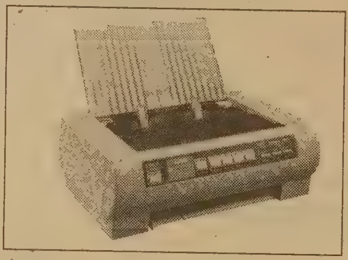

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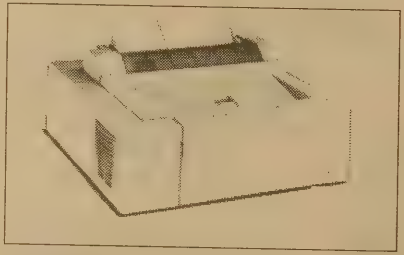

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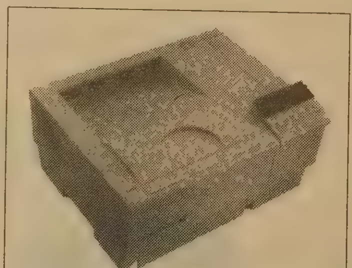

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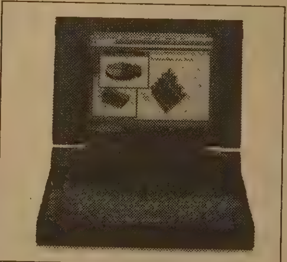

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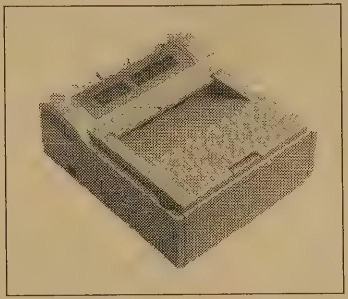

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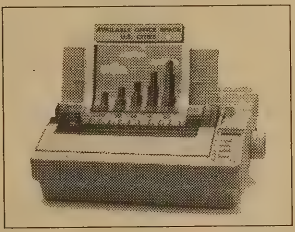

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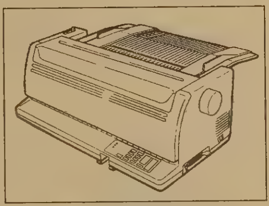

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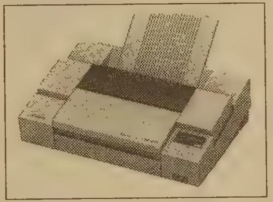

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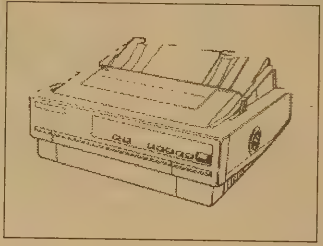

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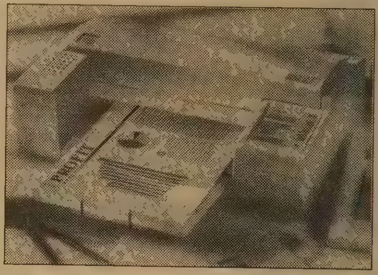

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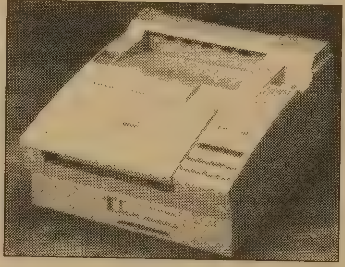

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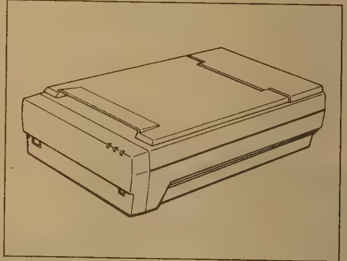

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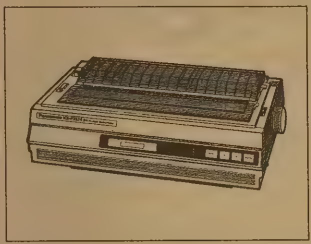

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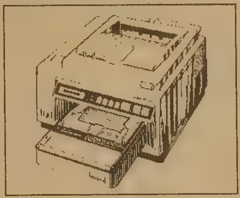

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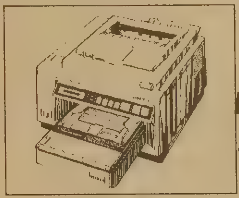

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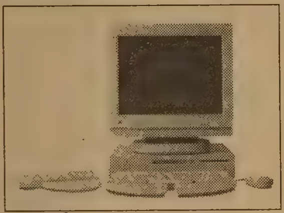

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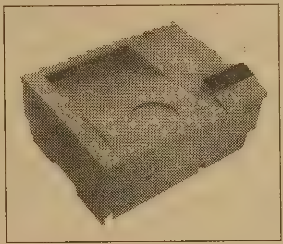

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Understanding DOS

A Beginner's Batch File Menu

BY LENNY BAILES

If you find yourself with some spare time on your hands, you might want to design a system to run programs more efficiently on your computer. Within the DOS operating system are hidden capabilities that let you avoid the time-consuming search for programs and data files within directories. The capacity to design menu systems for your programs is also hidden within the power of the MS-DOS batch language. This article will provide a basic introduction that allows you to take advantage of these features.

WHEN YOU TURN ON THE SYSTEM

Two files on your hard disk, the autoexec.bat and config.sys, hold the key to how your PC initializes, and what you see on the screen after startup. If you find yourself looking at the MS-DOS Shell program or at Windows, it is because a command to launch that program was placed in the autoexec startup list. The autoexec.bat and config.sys can also be used to load shareware utilities and drivers that improve the flexibility of the system. (Microsoft's SMARTDRIVE disk cache is one such utility that is installed automatically.)

These two startup files for DOS reside in the root directory of your hard disk, usually on Drive C. If you're not running Windows, you may view them with "Edit." Windows users may view the files with "Notepad." Either of these two text editing programs will bring up a tree-structured directory list on the screen when you select "Open File" from its menu. You should become acquainted with the directory-tree used by DOS if you want to obtain facility in using the PC. Each drive letter contains a "root" listing of programs and data files, plus a number of branch listings, each containing its own set of files. To find the autoexec.bat, look in the root listing for drive C.

The autoexec.bat will typically contain some basic statements that tell DOS what to show you on the screen.

"Prompt pg" changes the C-prompt to show you which directory is current.

The "Path=" statement is the key to launching programs from the C-prompt or building your own menus. If you've been brave enough to leave Windows or DOSShell, you may know that PC programs are started by typing their names from the command prompt. When DOS sees the name of a program on the command line, it searches the current directory as well as any directories *specified in the path statement.* When you install DOS, it automatically adds a few directories to the path. As you add new programs, their installation utilities create new directories and subdirectories, writing them to the path statement. You can also manually add new directories to the path statement simply by appending them to the "Path=" line in the autoexec.bat. Each directory entry in the statement begins with a "\" followed by the directory name and a semicolon (;). For instance, if you store some shareware programs in a UTIL directory, the path statement might read as follows:

```
Path=C:\;\DOS;\UTIL;\WINDOWS;
```

If you have more than one drive letter on your system, the drive letter may precede the slash mark in the directory name.

```
Path=C:\;\DOS;\UTIL\;D:\WINDOWS;
```

If no drive letter is present, DOS searches only the current drive for specified directories.

Although DOSShell and Windows may be used as menu systems, they contain a number of features that may confuse a new user (who may just want to write a letter or keep track of some business records). The DOS batch language allows you to circumvent distracting features on the screen and issue simple commands to the system. Batch files (files on your system with the .BAT extension) are itemized lists of successive commands for DOS to perform. Autoexec.bat is the initial batch file the system sees when you turn on the power.

A file called "W.BAT" might read as follows:

```
CD C:\WP51
WP
CLS
```

If you type "W" at the command line, DOS will first log onto the WP51 directory on drive C, then start the WP.EXE program file in that directory. The batch file may continue to be active after you quit the program launched on the second line. When you exit your word processor, DOS sees the "CLS" command, and clears the screen back to the C-prompt.

BUILDING A MENU

The batch principle shown above may help you to construct a simple command-line menu for yourself or for a novice user. If there are three software packages the user relies upon, you can construct three batch files to start them. If the three programs are WordPerfect, Lotus 1-2-3, and AutoCAD, the three batch files might read as follows:

```
1.BAT
CD\WP51
WP.EXE
2.BAT
CD\123r4
123
3.BAT
CD \ACAD
ACAD
```

(Note that the .EXE suffix is optional when invoking a program in a batch file, I've

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omitted it from the second two examples.)

These simple two-line batch files may be constructed in the MS-DOS Edit program, Notepad, or in another word processor. (If you use a word processor, the files must be saved as pure ASCII or "text-only.")

The next step in creation of the menu system is to type the text for the menu, itself, in the editor. You may use the *, /, or — characters to make the menu readable and attractive:

Once you've created the text for the menu, save the file to the root directory of Drive C. (For instance, you may call it "Menu.txt.")

```
****************************
* DAILY ACTIVITIES *
****************************
To select a program, choose a number from the following list:
1. WordPerfect
2. Lotus 1-2-3
3. AutoCad
```

To display the menu when you start the machine, instead of DOSShell or Windows, you must modify the autoexec.bat file. Reload autoexec.bat into your text editor and look for the line that says "DOSShell" or "Win." You may tell DOS to ignore the line by placing the letters REM (for remark) in front of the statement. To display your menu, you may use the DOS "Type" command:

```
AUTOEXEC.BAT
   Prompt $p$g
   Smartdrv 512
   rem DOSSHELL
   TYPE MENU.TXT
```

Now the menu system is almost complete. As it stands, when the user selects 1, 2, or 3 from the menu, the appropriate program will start, but when he or she quits the program, the system will return to the C-prompt. To redisplay the menu after exiting a program, some lines must be added to each of the three program batch files. For instance:

```
1.BAT
   CD \WP51
   WP.EXE
   CD \
   CLS
   TYPE MENU.TXT
```

Add the appropriate lines to each of the three batch files in the root directory of drive C, and you have a very basic working menu system that anyone can use avoiding confusion.

The DOS batch language allows you to circumvent distracting features on the screen and issue simple commands to the system.

Further refinement of the menu system would take advantage of the DOS directory system by storing the batch files in their own directory and adding it to the path statement in autoexec.bat. For example, use the DOS Makedir (MD) command to create a directory called BAT on drive C.

```
C:\>MD BAT
```

Copy 1.BAT, 2.BAT and 3.BAT to C:\BAT. Edit the path statement in the autoexec.bat so that it includes the new \BAT directory.

```
Path=C:\;\DOS;\WP51;\123r4;
\ACAD;\BAT;
```

You may also add some choices to the menu to cover system tasks that must typically be performed within DOS. For example:

```
4. Format a diskette

4.BAT
Format a:
CLS
TYPE MENU.TXT

5. Backup Spreadsheet
Documents
5.BAT
XCOPY C:\123r4\*.WKS A:
CLS
TYPE MENU.TXT
```

The DOSShell program included with MS-DOS 5 and 6 includes a more complex procedure for menu construction. Learning the DOS internal batch language, however, is a springboard to understanding that will let you build the system to meet other user requirements as they arise. ■

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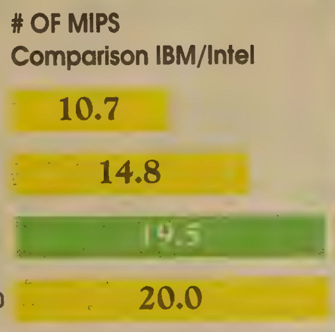

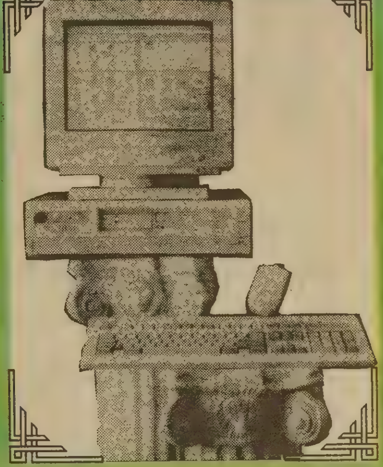

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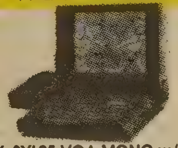

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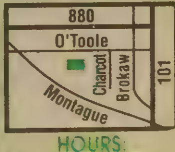

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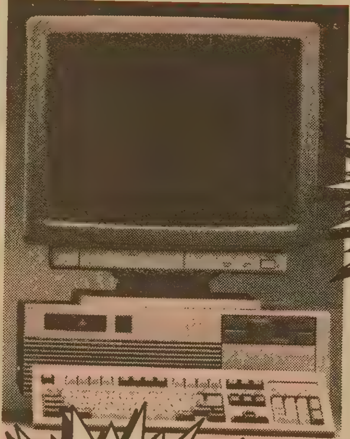

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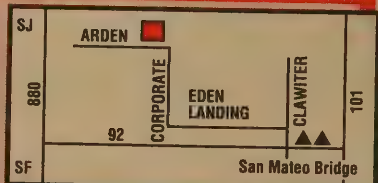

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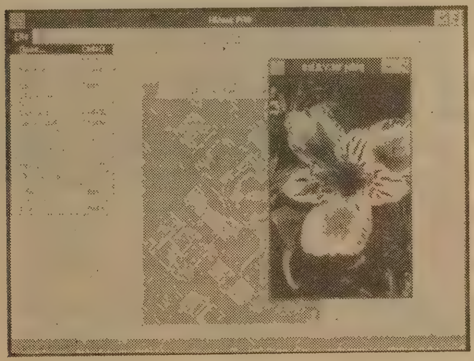
List Price: $169
Reviewed By: Birrell Walsh

If you work with graphics, most likely you have been frustrated by the variety of file formats. For instance, an image may be in GIF, the Graphic Interchange Format that CompuServe developed. You are using Microsoft Windows and would like to strip the color and put some print over that picture using Windows Paint (with a PCX or BMP file format). After that, you might want to convert it into fax format and print it, so you can see how it will look before you send it off.



HiJaak Pro for Windows will handle all these conversions for you, and do a stack of other chores at the same time. It will translate among some sixty graphics formats—Amiga, Mac, and fax as well as PC. You can capture MS-DOS and Windows screens and process them in HiJaak. The images can be modified: you can tune the color, or strip it entirely. You can control contrast and brightness, gamma, and half-toning. You can keep a record of the conversions you have made, and apply the same changes to other pictures. The settings you use can be stored in a file and applied to many other files.

A couple of quibbles: It is possible to convert from raster to raster format, from vector to raster, and vector to vector. What you cannot do is convert raster to vector. Also, I had one total lockup while trying to convert from what AutoCAD's Chaos Program identified as a GIF format. HiJaak just stopped and I had to reboot.

UPDATES

✣ **Addstor** released **Organize Your Way 4.0**. The new version of the information and contact management utility, previously titled Your Way, costs $99. Addstor, Inc. 1040 Marsh Rd., Menlo Park, CA 94025. (415)688-0470.

✣ **Aldus** released **Aldus Fetch 1.2**, an upgrade to its multiuser, mixed-media database program for the Mac. Registered owners of Fetch 1.0 can receive the upgrade for free. Aldus Corp., 411 First Ave. S., Seattle, WA 98104-2871. (206)398-8819.

✣ **Claris** announced **MacWrite Pro 1.5**. This new version is the first Claris product to support all aspects of System 7 Pro, including PowerTalk. Owners who purchased MacWrite Pro 1.0 after August 15, 1993, may receive the upgrade at no cost. Other owners of v1.0 may receive the upgrade for $29 through March 31, 1994. Owners of earlier versions of MacWrite may purchase the new version for $69 through that date as well. Claris Corp., 5201 Patrick Henry Dr., Santa Clara, CA 95052-8168. (408)987-7000.

✣ **FWB** is offering a **$50 rebate** to purchasers of any of six selected Hammer products between August 3 and October 31, 1993. The rebate applies to the internal or external **1600FMF, 2000FMF,** or **2100FMF** hard drive. Also covered are the **SledgeHammer 1050FMF**, the **Disk 1000 Magneto Optical Drive,** and the **SCSI JackHammer Fast & Wide SCSI-2 NuBus Accelerator Board**. FWB Inc., 2040 Polk St., Ste. 215, San Francisco, CA 94109. (415)474-8055.

✣ **Intuit** announced **QuickBooks 2.0 for DOS**. QuickBooks users who want to upgrade and Quicken users will be offered rebates of $45 and $25 respectively. A QuickBooks/QuickPay payroll software bundle will also be available for the DOS platform for $199.95. Intuit Inc., 155 Linfield Ave., Menlo Park, CA 94026-3014. (415)322-0573.

✣ **MICA Accounting Software** introduced **MICA IV 2.01**, a DOS-based integrated accounting system software. The new version includes a Btrieve record manager, multiuser capabilities in a network environment, and a Windows interface module. MICA Accounting Software, Inc., 2349 Memorial Blvd., Port Arthur, TX 77640. 1-800-448-MICA.

✣ **NewGen** has bundled the **FontPAC** with its **120MB SCSI drive**. The FontPAC contains 240 specially selected Bitstream fonts. The price of the bundle is $599. NewGen Systems Corp., 17550 Newhope St., Fountain Valley, CA 92708. (714)641-8600.

✣ **RasterOps** announced that MoviePak owners may purchase **MoviePak2** for $999 for the first ninety days following MoviePac2's release. The new version of the video compression/decompression daughtercard for Apple Macintosh computers processes four times more video data than the original MoviePak and features full-motion (60 fields per second) video digitizing. RasterOps Corp., 2500 Walsh Ave., Santa Clara, CA 95051. 1-800-SAY-COLOR.

✣ **Stairway Software** shipped **ScreenExtender 3.0**. This version of the WordPerfect screen utility supports WordPerfect 5.0/5.1 and the new WordPerfect 6.0 for DOS. Users of previous versions of ScreenExtender may upgrade for $29.95 plus $5.00 shipping and handling. Stairway Software, Inc., 913 First Colonial Rd., Ste. 102, Virginia Beach, VA 23454. (619)483-4333.

✣ **SunRize Industries** has bundled **Studio 16 3.0** with its **AD516** and **AD1012** digital audio cards. SunRize Industries, 2959 S. Winchester Blvd., 2nd Fl., Campbell, CA 95008. (408)374-4962.

✣ **Wacom Technology** released **Wacom Driver 2.2**, the latest version of its pressure-sensitive driver software. Upgrades are available for free to purchasers of ArtZ and SD series tablets since January 1993. You may download the software without manual or Tempo from Wacom's bulletin board, (415)960-0236. Wacom Technology Corp., 501 SE Columbia Shores Blvd., #300, Vancouver, WA 98661. 1-800-922-6613.

✣ **Zondervan** shipped **macBible 3.0**, a faster, more flexible version of their Bible reference software. Upgrades to v3.0 are free for users who purchased v2.0 after January 1, 1993. Zondervan Electronic Publishing, 5300 Patterson Ave., Grand Rapids, MI 49506. (616)698-6900.

This was true in HiJaak 1.1 and unfortunately is also true for HiJaak Pro for Windows. I don't mind the program being baffled by a file format; I do wish it would not crash. I was able to get the same image with DOS screen capture.

I depend on HiJaak to handle all my graphic conversions. As a bonus, a "thumbnail" graphic viewer and three hundred clipart images are included. (Inset Systems, Inc., 71 Commerce Dr., Brookfield, CT 06804. 1-800-374-6738)

INFOSELECT FOR WINDOWS

Published By: Micro Logic Corp.
List Price: $149.95
Reviewed By: Birrell Walsh

I have had the pleasure recently of using InfoSelect for Windows. This is the third incarnation of this simple random-text program. As in the first two (Tornado Notes and InfoSelect for DOS), you create short notes. Each note lives in its own small window within the program. You find the notes you want with a lightning-fast searcher, activated with a single keystroke, which can find any text in any window.

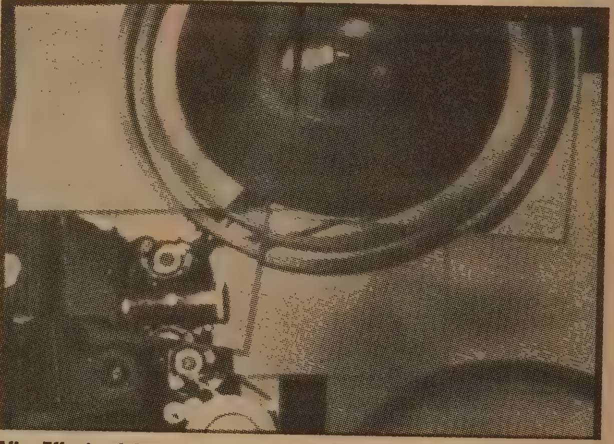
"Is that all?" you might ask. There are some bells and whistles; but basically that is all there is to InfoSelect for Windows. Its simplicity seems to be its strength. InfoSelect is perfect for any kind of information that used to be stored on three-by-five cards, rolodexes, and messy desks. In our house we use it for contact files, phone books, recipes, reminders, to-do lists, bibliographies, quotations, and random notes for future projects. Other places use it for phone messages (it is network capable), help-desk notes, small mail-merge projects, and history note-files. When I wonder, "Who was that guy who sells widgets in Tasmania?," I find his name instantly in my InfoSelect file.

Several files of useful information (area codes, ASCII numbers, weights and measures, and the like) are included. Among the bells and whistles are the ability to sort the notes alphabetically, to sort lines within a note, to export and import text, and to import database files. It has rudimentary text formatting, and the ability to create forms. (Micro Logic Corp. 1-800-342-5930)

OPTI CD CACHE

Published By: On Line Computer Systems
List Price: $89
Reviewed By: Woody Liswood

CD-ROM cache, like hard disk cache, stores information from the CD in high-speed memory, so that when your application requests information from the CD-ROM, the information is provided directly from memory. Of course, if the cache is intelligent, it usually reads ahead and is ready to instantly provide the information your application requests.


After Effects v1.1

Opti CD Cache works as expected and is fully compatible with MS-DOS 5.0 and 6.0, Windows 3.1, and QEMM 7.0. I had no problems with the setup in any of these configurations. In fact, I still use the DOS Smartdrv.sys for caching my hard and floppy drives and it happily coexists with Opti CD Cache.

Install is also what you would expect and is done from DOS. You can choose from 512K to 2MB or greater. I tested at all of the sizes, and on a 16MB PC 512K seemed to give me the same response as the higher memory settings. Since I normally run CD-ROMs for information databases, this makes some sense. But even with CD-ROMs that contained video movies, the higher settings did not give me any increase in movie smoothness—so I saved the RAM for Windows.

Feel and response time is important for any software. Opti CD Cache did make my CD-ROM drives appear to run faster and did not cause any problems with my other TSR programs. In one of the computers I tested Opti CD Cache in, I run twenty different device drivers and TSRs. This program fit right in.

The internal algorithm which Opti CD Cache uses is an LRU, or least recently used, approach. This keeps the most frequently requested information, such as menu items, in memory for the longest time possible.

I would recommend Opti CD Cache for anyone who uses a CD-ROM drive and is unhappy with the slow read response from that drive. (On Line Computer Systems, Inc., 20251 Century Blvd., Germantown, MD 20874-1196. 1-800-922-9204)

MACINTOSH SOFTWARE REVIEWS

AFTER EFFECTS V1.1

Published By: The Company of Science and Art (CoSA)
List Price: $1295
Reviewed By: Matthew Leeds

After Effects is a QuickTime application designed for digital video layering and compositing, special effects, and 2-D animation. It includes time-based filters for chroma keying, blurring, 3-D perspective

Continued on page 192

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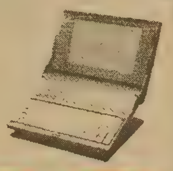

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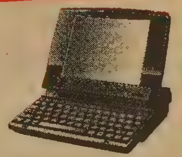

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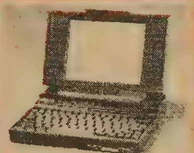

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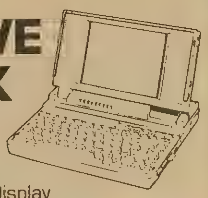

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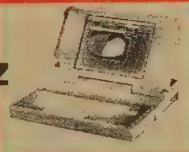

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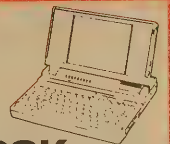

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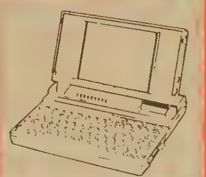

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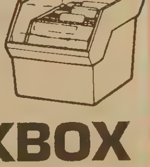

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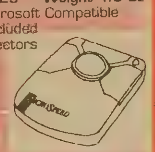

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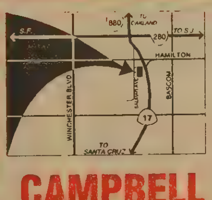

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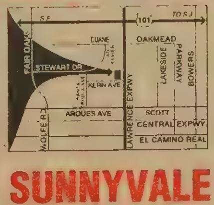

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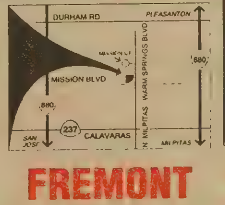

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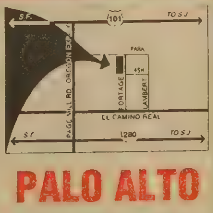

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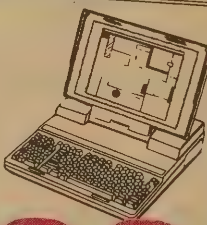

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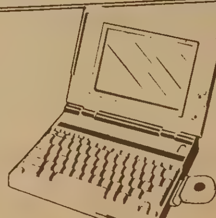

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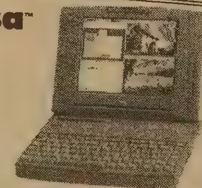

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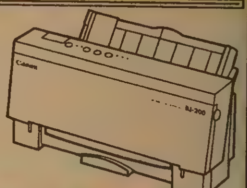

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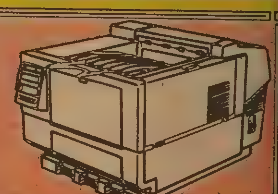

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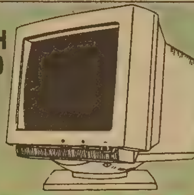

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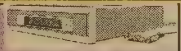

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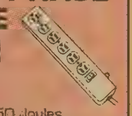

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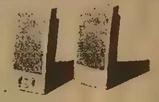

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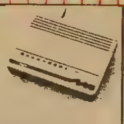

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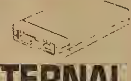

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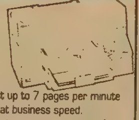

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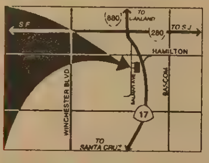

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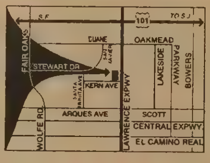

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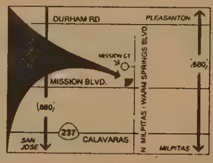

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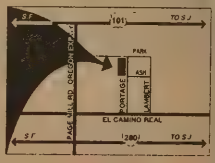

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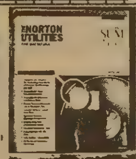

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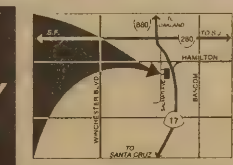

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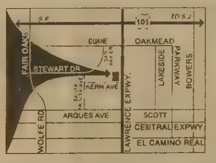

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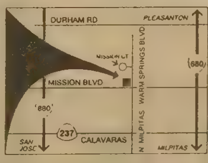

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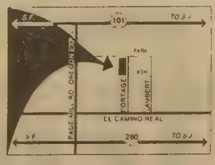

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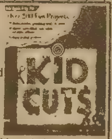

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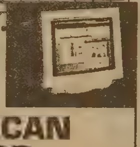

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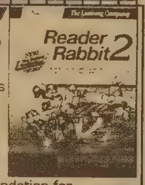

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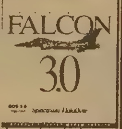

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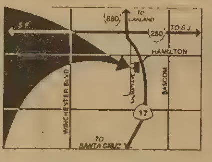

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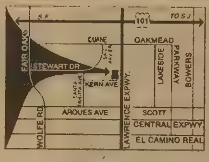

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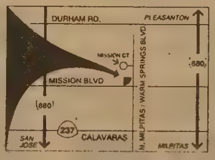

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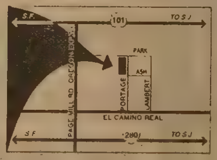

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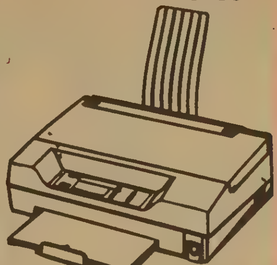

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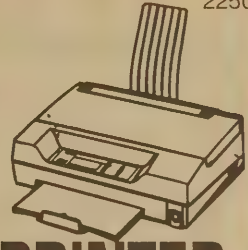

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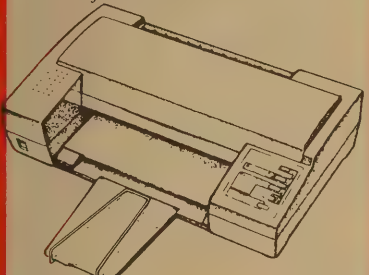

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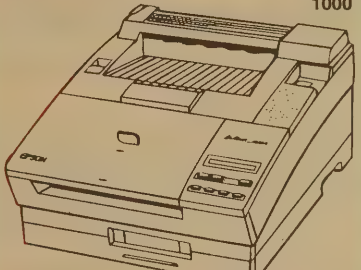

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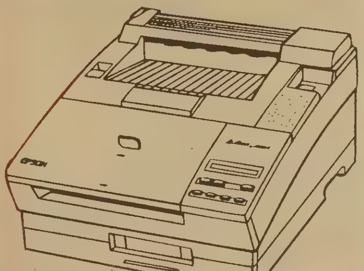

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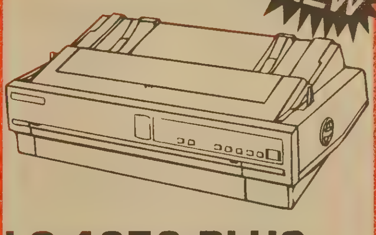

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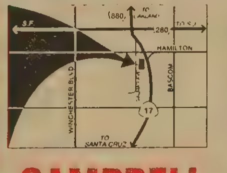

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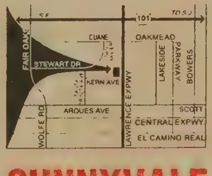

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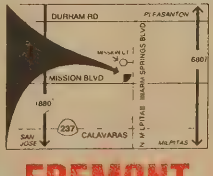

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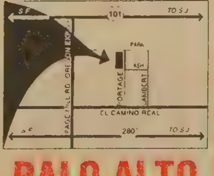

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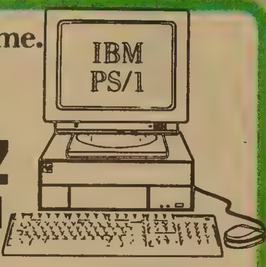

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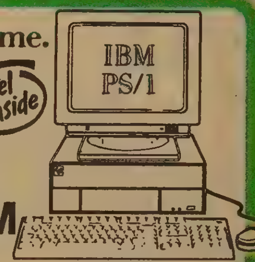

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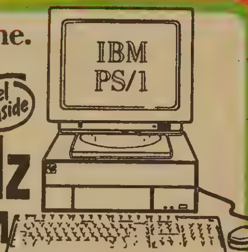

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Intel 486DX2 50MHz CPU • 253MB Hard Drive
4MB Memory Expandable to 64MB
3.5" 1.44MB & 5.25" 1.22MB Floppy Drives • Local Bus SVGA
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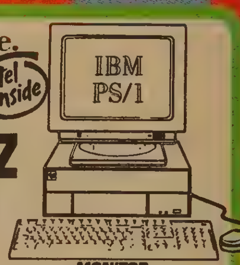

2155-50T

486DX2-66MHz

253MB SVGA SYSTEM

Intel 486DX2 66MHz CPU • 253MB Hard Drive
4MB Memory Expandable to 64MB • 8K Cache
3.5" 1.44MB/5.25" 1.2MB Floppy Drives
5 AT Slots • Local Bus SVGA
IBM Mouse • IBM Keyboard • FAX/Modem
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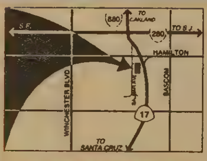
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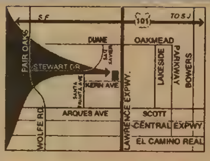
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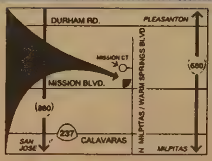
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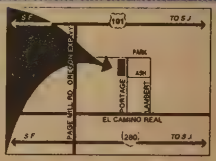
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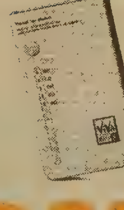

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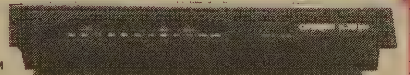

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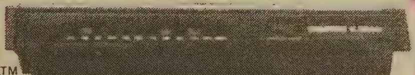

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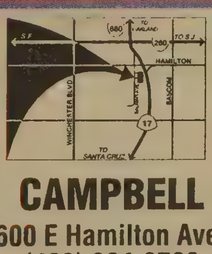
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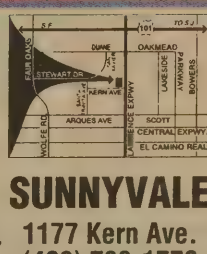
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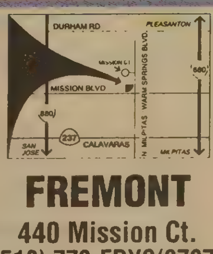
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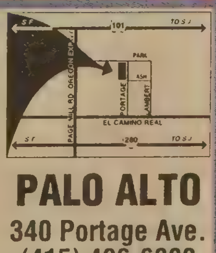
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MODEMS

FaxMe

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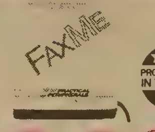

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Introducing the plug-in cartridge that turns an HP LaserJet printer into a plain paper receive FAX machine.
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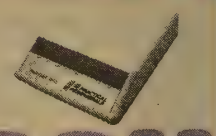

V.42 • Quick Link II Communication Software
PM2400F #1741737

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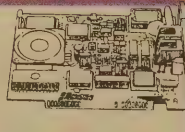

14,400 BAUD INTERNAL FAX/MODEM

14,400 Baud Modem/Fax
Super High Speed V.32 BIS Protocol
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V.32 V.42 V.42 BIS • QUICK LINK 11
PM9600FXMT
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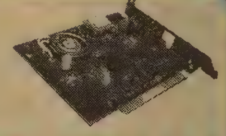

INTERNAL 2400 MODEM 9600 SEND & 4800 RECEIVE FAX

V.42 SOFTWARE QUICK LINK II
PM2400F #1741726

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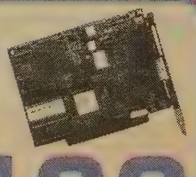
MACRONIX STEALTH 14,400 INTERNAL FAX/MODEM



For WIN • MNP 5 and V.42 BIS
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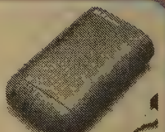

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14,400 bps Modem

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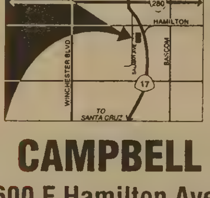
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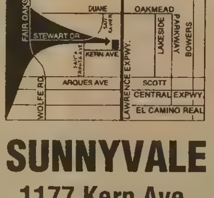
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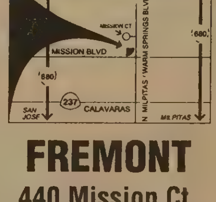
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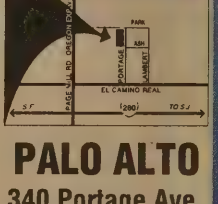
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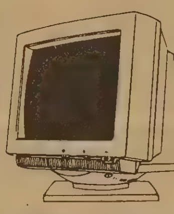
MONITOR



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Non-Glare • Low ELF & VLF
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#1813867

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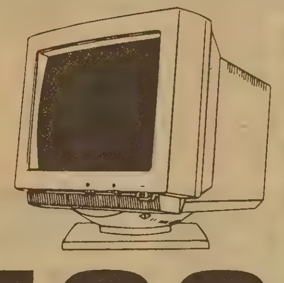
NEC 3FGE



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NON-INTERLACED
14" VGA ANALOG
FLAT SCREEN
MONITOR

1024 X 768 • Analog
Flat Screen
Non-Interlaced
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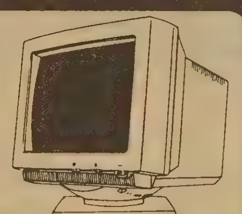

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15" SUPER VGA MONITOR

1024 X 768 Non-Interlaced Flat Screen Monitor
4FGE #1641459

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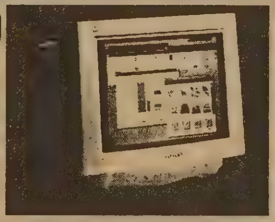

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MONITOR

1024 X 768 72HZ
Non-Interlaced
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Control
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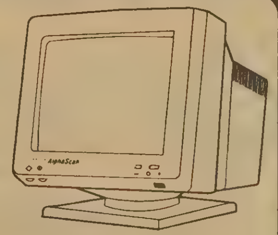

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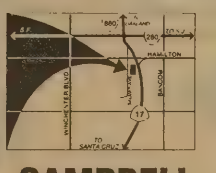
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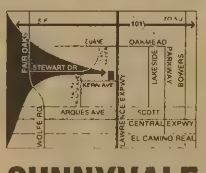
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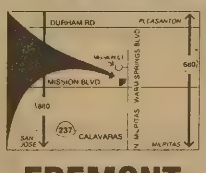
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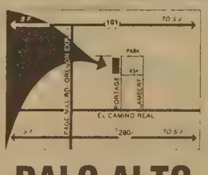
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MODEL 170 #1838592

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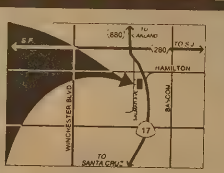
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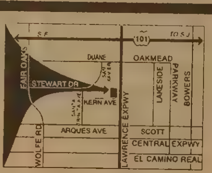
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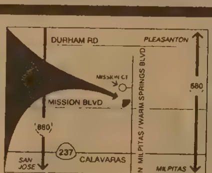
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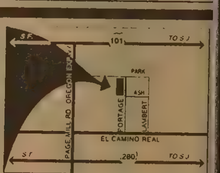
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19 msec Access • IDE Hard Drive • 3.5" x 1 #1746868

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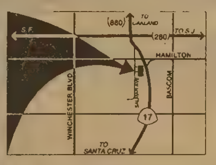

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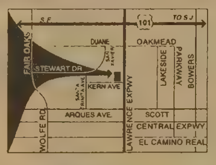

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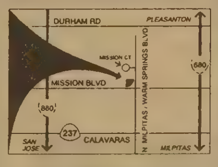

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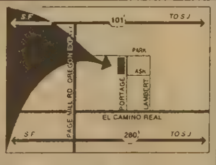

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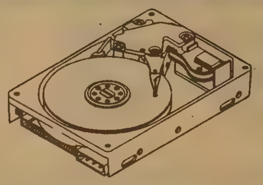
13 msec Access • 2 Year Warranty
AC1210 #1828522



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MAXTOR 213MB 3.5" IDE HARD DRIVE

3.5" Form Factor • 1" Height • 15ms Access 7213A #1694044

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MAXTOR 245MB 3.5" IDE HARD DRIVE

3.5" Format • 1" Height • 15ms Access MXT-7245A #1759934

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256K CACHE • FAST ACCESS #1758449

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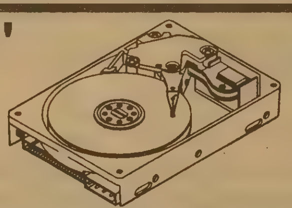
CONNER 255MB 3.5" IDE HARD DRIVE

12ms Average Access • 1" HT. • 3.5" Form Factor
CP30254 #1795356



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SAMSUNG 255MB 3.5" IDE HARD DRIVE

3.5" Form Factor 1" Ht. SHD-3122A #1786011

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SEAGATE 260MB IDE HARD DRIVE

1" HT. • 16ms Access • 64K Cache • Bulk Pack ST-3290A #1836213

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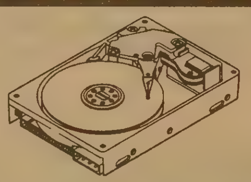
CONNER 340MB 3.5" IDE HARD DRIVE

3.5" • 13ms Access CP30344 #1825736



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WESTERN DIGITAL 340MB 3.5" IDE HARD DRIVE

3.5" • 12ms Average Access AC2340 #1771644

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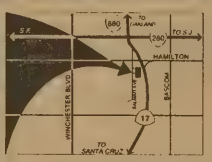
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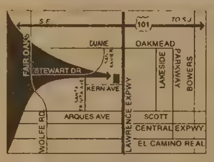
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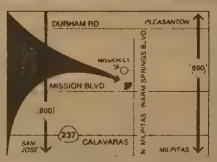
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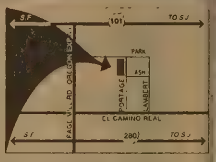
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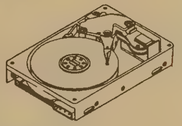

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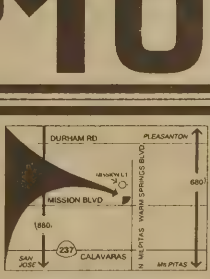
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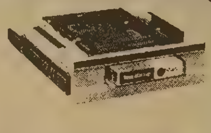

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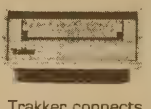

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Plug and Play. No hardware installation. Trakker connects to your computer's parallel printer port.
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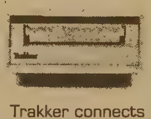

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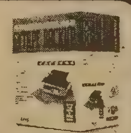

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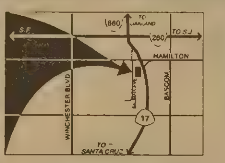
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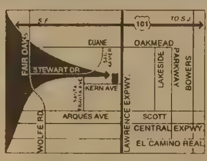
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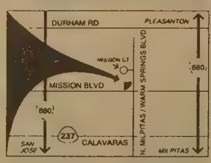
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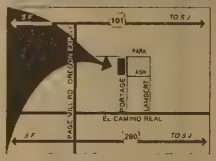
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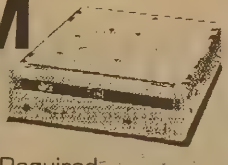

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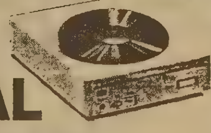

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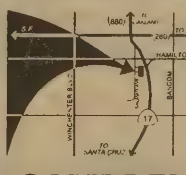
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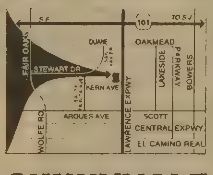
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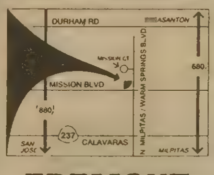
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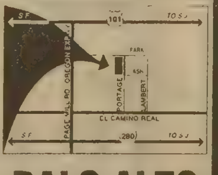
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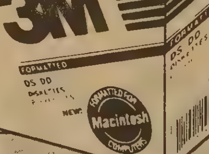

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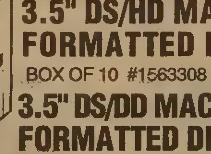

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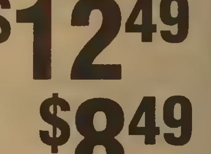

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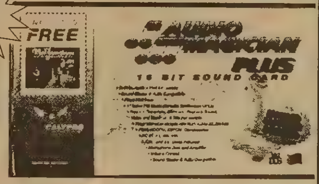
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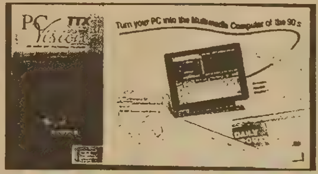
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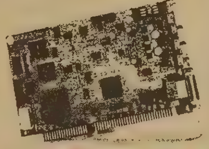

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- Includes Creative VoiceAssist speech recognition software
- Expansion connector for Wave Blaster
- Real-time, 16-bit compression and decompression
- CD-ROM interface for Creative Labs/Panasonic CR-523, CR-563, Sony CDU31A and MItsumi CRMC-LU005 CD-ROM drives
- Windows 3.1, OS/2 2.x and MPC2 compatible

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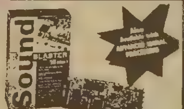
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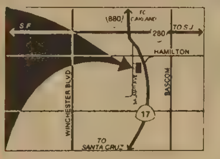
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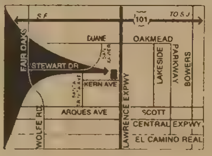
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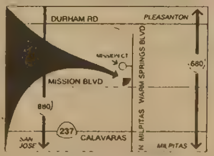
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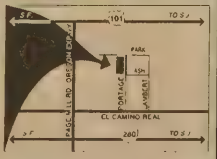
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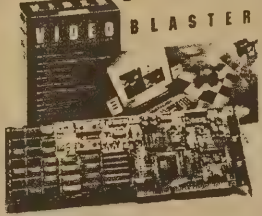

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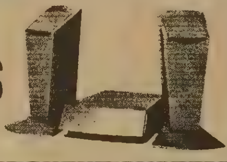

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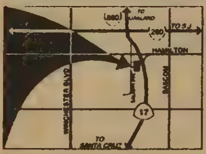
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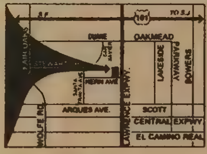
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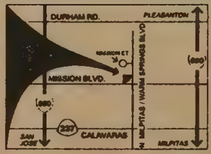
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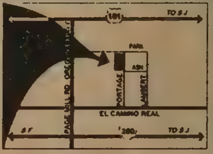
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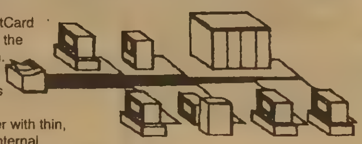

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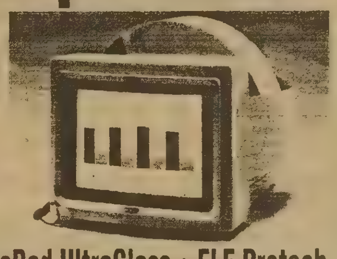

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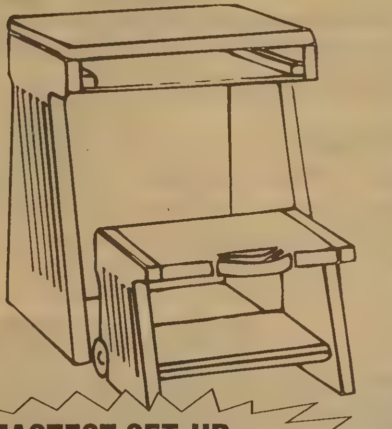

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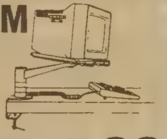

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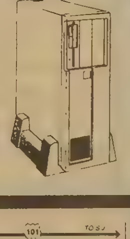

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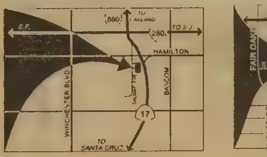
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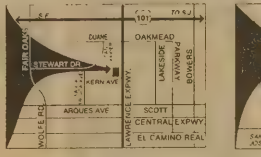
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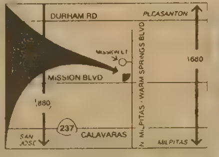
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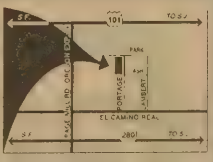
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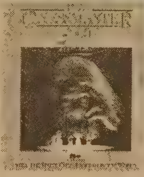

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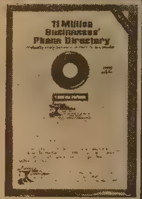
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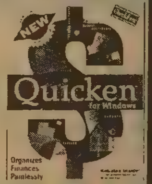
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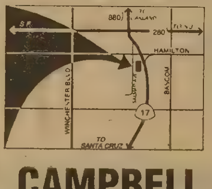
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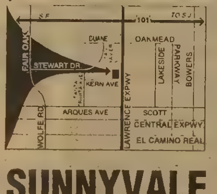
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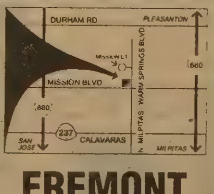
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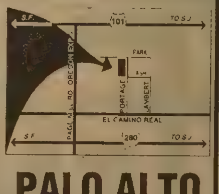
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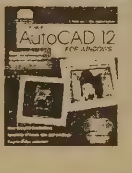
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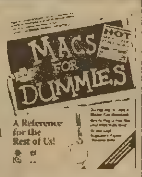
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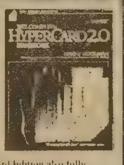
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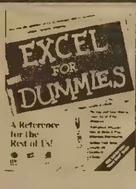
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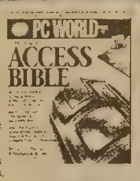
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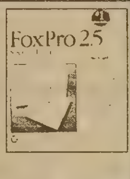

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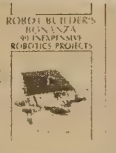
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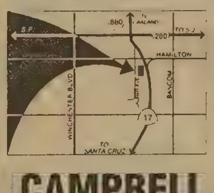
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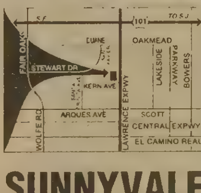
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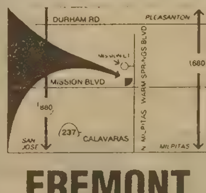
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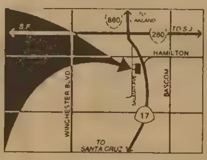

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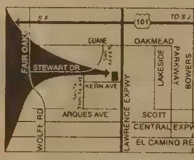

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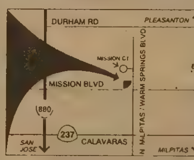

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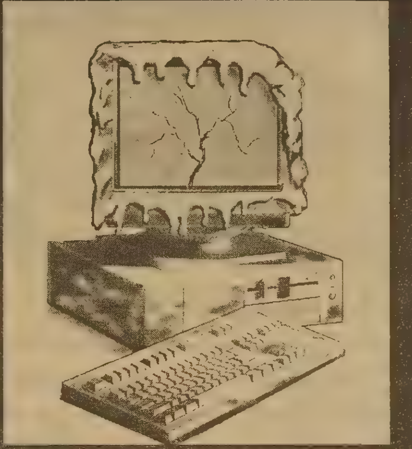

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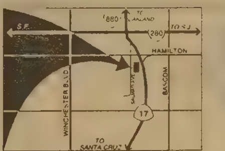

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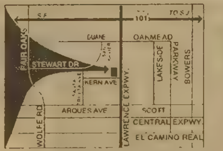

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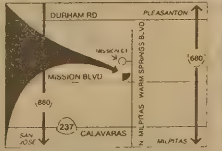

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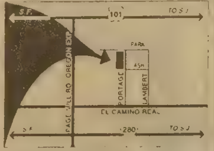

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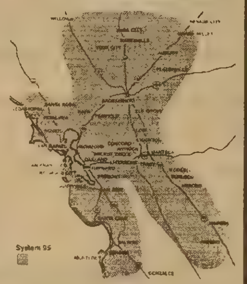

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Weighing in at 7.7 ounces and measuring 11.6 cubic inches, this is one of the lightest and most advanced cellular telephones available. With 100 alpha numeric memory, retractable antenna, standard battery, and desktop charger, you can receive state of the art performance and design for only...

NO ACTIVATION FEE

$489.95**
- 25

$464.95*

*WITH $25 INSTANT REBATE (SERVICE ACTIVATION REQUIRED)

Model MICROTAC
LITE BASE
#1750739

MOTOROLA

MICRO TAC LITE CELLULAR PHONE

Weighing in at 7.7 ounces and measuring 11.6 cubic inches, this is the lightest and most advanced cellular telephone available. With 100 alpha numeric memory, retractable antenna, standard battery, carrying case with handstrap, belt clip, and rapidcharger, you can receive state of the art performance and design for only...

NO ACTIVATION FEE

$569**
- 25

$544*

*WITH $25 INSTANT REBATE (SERVICE ACTIVATION REQUIRED)

Model
MICRO TAC LITE
#1705832

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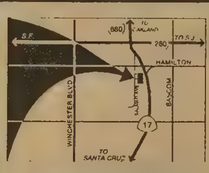
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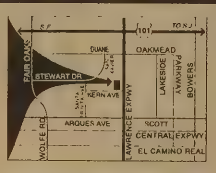
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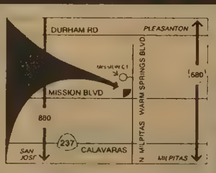
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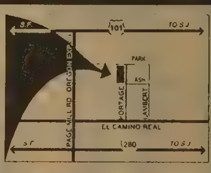
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Panasonic's new dual micro cassette answering system offers an LCD Call Counter, marker message, room monitor, auto disconnect, electronic auto disconnect, electronic volume control, audible message alert, and much more for only…

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MODEL
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#1740208

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DUAL MICRO CASSETTE ANSWERING SYSTEM W/ VOICE TIME/DAY STAMP

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$\$89^{95}$

MODEL
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#1740219

SPEAKER PHONES

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SPEAKERPHONE

For the office or home, this phone has all the features you need. It has a speaker phone, 28 station automatic dialer, automatic redial and much more.

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MODEL
KX-T2315
#1530100

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SPEAKER PHONE

This outstanding value from Panasonic offers one-touch dialing for up to 28 16-digit telephone numbers, auto redial for up to 15 times, redial memory transfer, and a save button for temporary redial memory storage for only…

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MODEL
KX-T2355
#1287186

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LCD READOUT SPEAKERPHONE

This outstanding value from Panasonic offers a 12-digit LCD [illegible] readout for phone [illegible] modes. Perfect for call time [illegible] home or office at only...

$\$69^{95}$

MODEL
KX-T2365
#163665

MULTI-LINE BUSINESS PHONES

Panasonic

TWO LINE PHONE

A two line phone doesn't have to cost a fortune. Panasonic has the low cost answer for you. This unit has a convenient auto dialer, conference calling and much more!

$\$49^{95}$

MODEL
KX-T3110
#1505313

Panasonic

2-LINE SPEAKERPHONE W/ LCD DISPLAY

From Panasonic comes this fully featured 2-line speakerphone with LCD display, 3-way conference call, volume control for speaker and handset, 24-station one-touch dialer, auto redial, flash, separate ringer tone, line status indicator, memo dial, and save redial, all for only…

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MODEL
KX-T3175
#1745122

AVAILABLE IN BLACK OR WHITE

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3-LINE SPEAKERPHONE WITH LCD DISPLAY

From Panasonic comes [illegible] LCD [illegible]ference call, volume featured 3-li[illegible] speaker and handset, 48-station one-touch dialer, auto redial, flash, separate ringer tone, line status indicator, memo dial, and save redial, all for only…

$\$159^{95}$

MODEL
KX-T3185
#1768039

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CORDLESS PHONES

Panasonic

10 CHANNEL AUTOSCAN CORDLESS PHONE

Panasonic's newest cordless phone comes equipped with a retractable flexible rubber antenna, sound charger technology, which helps filter out background noise resulting in enhanced sound quality, and 1-way paging between the base and handset. An excellent value at only…

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MODEL
KX-T 3850
#1764839

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10 CHANNEL CORDLESS SPEAKERPHONE w/ANSWERING MACHINE

This new top of the line cordless answering system with sound charger technology delivers sound so clear, you will hardly believe your ears! Some of the features included are, 2 way paging, intercom, auto security system, message alert, 2-way and memo recording just to name a few. Now only…

$\$159^{95}$

MODEL
KX-T4330
#1796483

Panasonic

THE WORLD'S BEST CORDLESS [illegible]00MHz

[illegible] incredible! Take this phone down the street to your neighbors for a barbeque and you will think you were calling from your own backyard! But that's not all! It's also the ultimate cordless phone for small businesses that can't afford to have anything interfere with an important call! Besides the advantages of mobility and clarity, this model has an impressive list of features including, intercom with 2-way paging, 30 channel auto scanning, auto speed dialer, private digital security and much much more! Now only...

$\$329$

MODEL
KX-T9000
#1735370

FAX MACHINES

Panasonic

FAX MACHINE WITH ANSWERING MACHINE AND ANTI-CURL

This fully featured Fax from Panasonic comes equipped with an auto-logic answering system and anti-curl, as well as copier capabilities. It's the perfect secretary for your home or business!

MODEL
KX-F150
#1770001

$\$399$

Panasonic

FAX MACHINE WITH PAPER CUTTER AND ANTI-CUR[illegible]

[illegible]rom This f[illegible] comes equipped with an auto-logic answering system and auto paper cutter, as well as copier capabilities. It's the perfect secretary for your home or business!

MODEL
KX-F250
#1770023

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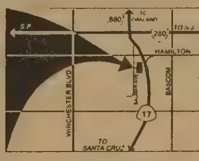

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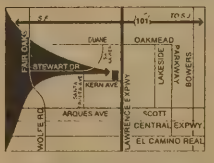

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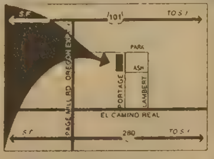

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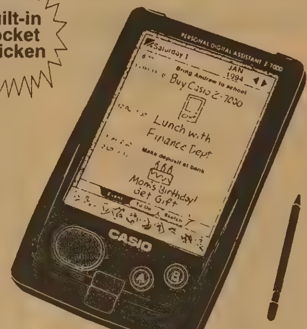
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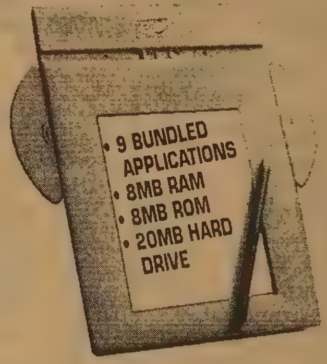

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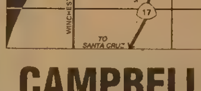
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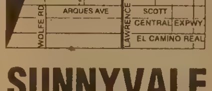
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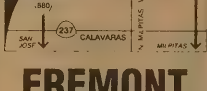
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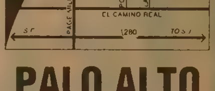
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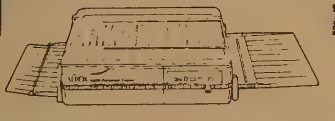

Don't settle for a copy when you can have the original... Xerox. Xerox is so confident in the quality and reliability of its copiers that it offers an exclusive 3 year warranty on all its copiers. This model offers a paper tray that stacks 40 sheets, a built-in carrying handle and removable storable paper trays, multi-copy capability which can be set from 1 to 9 copies or "C" for continuous up to 20 copies, and automatic exposure which scans documents for degrees of lightness or darkness to determining the appropriate exposure setting. An invaluable addition to any home office. At only....

$497

Model 5220
#1706095

DRY INK CARTRIDGE
NOT INCLUDED

XEROX COPIER w/REDUCTION & ENLARGEMENT

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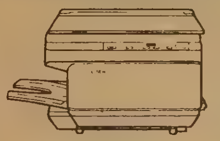


If you're looking for versatility and premium performance in a copier your search is over! Xerox has designed a copier that incorporates reduction/enlargement technology enabling you to reduce a copy 75% and 95%, and enlarge to 124%, a 250 sheet paper tray which adjusts to hold memo to letter to legal size paper, built-in automatic exposure which scans documents for degrees of lightness or darkness to determine the appropriate exposure setting, multi-copy capability of 1 to 50 copies, letter and legal size copying, and manual bypass, all backed by the experts at team Xerox. Now just...

$797

Model 5009
#1706109

DRY INK CARTRIDGE
NOT INCLUDED

XEROX SMALL BUSINESS COPIER w/REDUCTION & ENLARGEMENT

XEROX Authorized Retailer

3 YEAR TOTAL SATISFACTION GUARANTEE

Xerox engineers have developed an affordable copier for businesses with high volume demands. The included copy cartridge is designed to deliver 18,000 copies and is guaranteed to deliver 16,000 before needing replacement. Other features include a 250 sheet paper tray, automatic exposure, photo mode to make clear copies of photographs, a graphic display which indicates the location of jammed paper, that the paper tray is empty, and that the copy cartridge is nearing the end of its life, a multi-copy button that can be set from 1 to 99 copies, dual electonic meters which displays the number of copies made by the cartridge in use and the total number of copies made by the copier, an output tray that collects up to 110 finished copies, and much more. An excellent investment at...

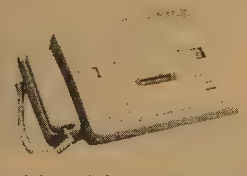
$1597

Model 5011
#1706121

BROTHER HAS THE FAX!

brother. FAX MACHINE W/PAPER CUTTER

We're at your side.



Brother's breakthrough fax machine incorporates newly developed therma plus technology which uses fax paper that feels like plain paper and reduces print fading (lasts 3 times longer than thermal paper under normal filing conditions, and you can even use a highlighter!). Other features include, 15 page document feeder, 60 station memory, 16 level grey scale, activity report, polling and much more for only...

$339

MODEL FAX-600
#1705603

brother. FACSIMILE MESSAGE CENTRE W/AUTO PAPER CUTTER

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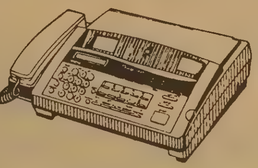

The Facsmile Message Center was designed so that the internal memory can be used for out of paper reception (up to 50 pages), as an all digital answering machine (up to 12 minutes), or you can share the memory on a first come first serve basis! Other features include 15 page auto document feeder, 32 level grayscale, 16 digit LCD display, sequential broadcasting, multi-copying with sorting, 60 station memory, Fax/Tel switch, multiple resolution transmission, and much more for only...

$499

MODEL FAX-780
#1796944

brother. PLAIN PAPER FAX W/256K MEMORY

We're at your side.

Brother's done it again! Last year Brother broke the $400 price barrier in paper cutter Fax, and for an encore, Brother has destroyed the $799 stand alone plain paper Fax barrier with this unbelieveable value. Its 200 sheet paper cassette, 30 page auto document feeder, on-screen programming, "smoothing" enhanced image resolution, 48 digit LCD display, multiple resolution transmission, 32 level grayscale, 160 station memory, and Fax/Tel Switch makes this the best value you will find at only.....

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MODEL FAX-980
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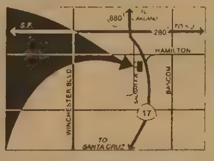

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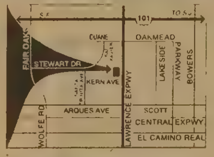

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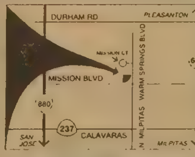

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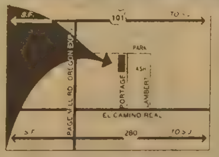

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THE TAS 465 brings an advanced level of power and reliability to general purpose scopes. It brings leading edge innovation to low-cost analog scopes with comprehensive features. Comprehensive Video Triggering simplifies triggering on complex video waveforms. With line or field (odd, even, or both) composite video selections and positive or negative sync, you can cleanly trigger on any NTSC, PAL, or SECAM video signal. The scopes' dual time base lets you zoom in on any portion of a waveform for closer examination. Auto Setup instantly delivers meaningful waveforms. Pressing the AUTOSET button automatically adjusts the horizontal, vertical, and triggering controls so that a stable signal is displayed.

TAS 465
#1823505

$1995

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100MHz LOGIC ANALYZER

32 Data Channels • 5ns Glitch Capture
Multi-Level Triggering • 8K Memory/Channel
The VC-3120 Logic Analyzer provides 25MHz analysis on up to 32 channels. With Soft-Key menus & on-line instructions. This logic analyzer is easy-to-use yet powerful enough for advanced digital design and microprocessor system debugging

V-C3120
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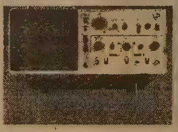

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This lightweight, slim-line scope has become the standard of high performance. Hitachi scopes have earned acclaim from field-serving and maintenance personnel worldwide. 2 Channel, Single Time Base, 3 Year Warranty

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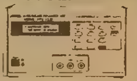

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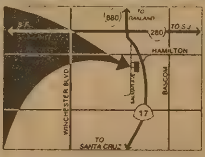

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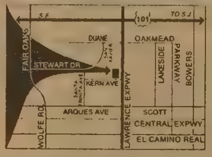

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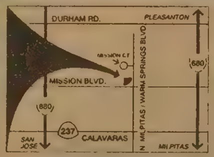

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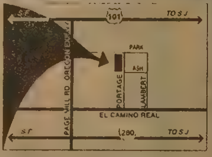

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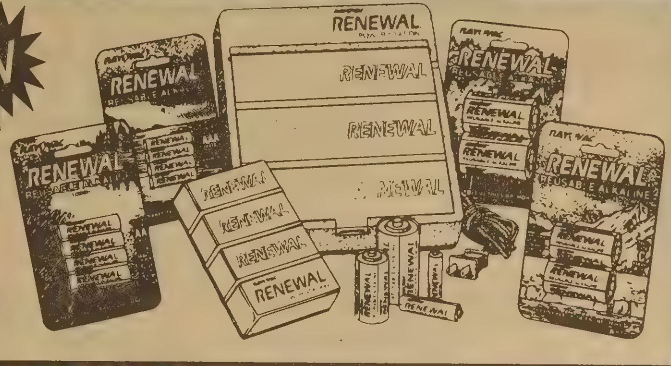
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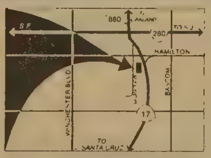
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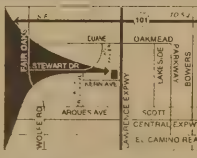
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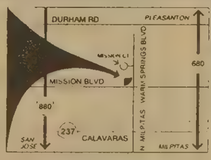
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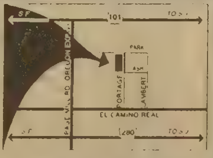
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Continued from page 160

and other effects. It uses a plug-in architecture so that additional effects may be added. You can use After Effects to independently scale, rotate, fade, position, and mask each layer of a video. An unlimited number of layers can be composited.

QuickTime clips, PICT, PICS, and sound files may be used, but no sound editing features are available. Key frames are used to set points in time over which effects are applied. You can work in a low-resolution or wire-frame mode to set up or preview effects then switch to a higher resolution for final rendering and output. Layers can be switched off to speed up previews, and rendering can be interrupted at any time. Alpha channel support makes doing mattes, masking, and anti-aliasing easier. Final output includes sub-pixel positioning and field rendering for smooth motion, and anti-aliasing to eliminate jaggies and smooth to edges.

The After Effects user interface is both powerful and complicated. This is not a program you learn in a few hours. It is not a QuickTime editing program like Premiere. Instead it is specifically designed for the creation of sophisticated special effects. If you're willing to invest the time to learn it (and the money to buy it) you'll be amply rewarded with professional quality results.

Note: CoSA was acquired by Aldus in July '93. (The Company of Science and Art [CoSA], 14 Imperial Place, Suite 203, Providence, RI 02903. 401/831-2672)

DEBABELIZER V1.5

Published By: Equilibrium
List Price: $299
Reviewed By: Matthew Leeds

DeBabelizer is all the things you wish you could do with Photoshop but can't. That's not quite accurate, but while it does not do everything, DeBabelizer has a strong, growing following of users. DeBabelizer opens just about any bitmap graphics file, lets you perform image processing on it (including scripted batch processing), and then saves it in just about any file format. Supported file formats include Macintosh, DOS/Windows, Apple II, Atari ST, Commodore 64, Amiga, Silicon Graphics, Sun Microsystems, X Windows, CD-I, Abekas, GIF, JPEG, Photo CD, Photoshop 2.5, and others.

Some of the processing you can do includes automatically creating the best shared palette for a series of images and then remapping them to that palette; reducing, merging, swapping, rearranging, and translating palettes; converting from one image file format to another; dithering images to smaller palettes; scaling images; automatic background removal; automated use of third-party Photoshop plug-ins; and animation conversion.

Debabelizer's "watch me" script builder makes scripting and batch processing relatively easy. AppleEvents are also supported. DeBabelizer excels at palette manipulation, something almost impossible with Photoshop. Originally created as a software developer's tool, DeBabelizer has benefited from the thousands of user-hours input from graphics professionals. You'll find tools for hundreds of processes included, designed for solving tough graphics problems. Anyone who works with bitmapped graphics will find it useful, some will find it essential. (Equilibrium, Inc., 475 Gate Five Rd., Suite 225, Sausalito, CA 94965. 415/332-4343)

CD-ROM TOOLKIT V1.0.3

Published By: FWB, Inc.
List Price: $79.95
Reviewed By: Matthew Leeds

The CD-ROM Toolkit (CDT) is an enhanced CD-ROM driver package. In addition to supporting a tremendous variety of CD-ROM drives, it adds two types of data caching, support for Photo CD, and an improved audio access program.

The CDT Control Panel automatically scans the SCSI bus for attached CD-ROM drives. You can disable the CDT for any given SCSI address, allowing the use of a different driver for that specific CD-ROM drive. You can also toggle the data caching for each specific SCSI address. In addition, you can set the amount of space used by the two types of data caches offered by CDT.

The CDT file cache is a file and directory information cache of data that has been read off the CD. It is cached to your hard drive, allowing subsequent reads to occur at hard drive speeds instead of CD speeds. There is an option to "pre-cache" certain information including directories,

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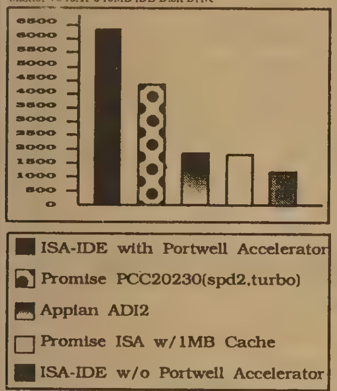

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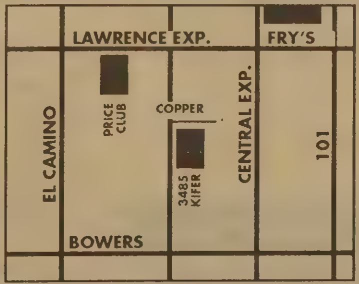

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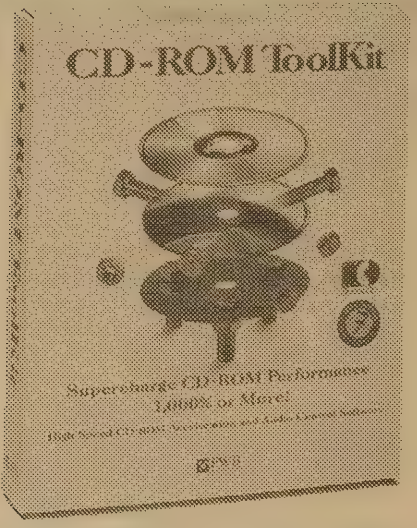


desktop files, System 7 icons, and System 7 aliases.

The CDT read ahead cache is designed to anticipate the next request for data off the CD. It reads the next several blocks of data each time your application requests data. This cache is stored in RAM.

CDT can provide Photo CD single session capabilities to most CD-ROM drives, and multisession capability to those drives with the requisite hardware support. It also provides extended audio capability via the CDT Remote DA. This includes audible scan in either direction, audio channel selection, and volume control.

CDT is a remarkable improvement over most of the commercial CD-ROM drivers bundled with drives and can extend the usable life of older drives by improving performance and adding Photo CD support. (FWB, Inc., 2040 Polk St., Suite 215, San Francisco, CA 94109. 415/474-8055)

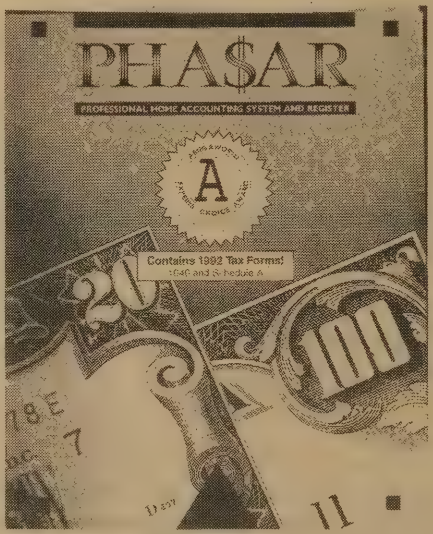
AMIGA SOFTWARE REVIEWS

PHASAR 4.0

Published By: Psygnosis
List Price: $89.95
Reviewed By: Douglas J. Nakakihara

If you're looking for a personal finance manager, Phasar has everything you need and more. It lets you keep track of up to fifteen hundred transactions per month using 250 accounts and 999 income and expense categories.

Phasar does everything it can to minimize data entry. Whenever possible, it will guess what your most likely input will be (e.g., incrementing check numbers), so you only have to press the Return key. At other times, a scrolling list of choices is available, from which you can make a selection with the mouse. Recurring transactions can be set to post automatically.



With Phasar you can set up a monthly budget and automatically compare it to your actual spending. Painlessly confirm balances of your checking, savings, loans, and credit card accounts to monthly statements. Find specific payments easily with search functions. Account activity can be displayed and printed in detailed or summarized format. You can even print a net worth statement.

Phasar v4.0 features check printing, tax form preparation, an address organizer, a diary, and an appointment calendar. This is a solid package with a thick, detailed manual. Highly recommended! (Psygnosis Corp., 29 St. Mary's Court, Brookline, MA 02146. 617/497-7794)

CYGNUSED PROFESSIONAL RELEASE 3

Published By: ASDG, Inc.
List Price: $99.95
Reviewed By: Douglas J. Nakakihara

A text editor with the price tag of a word processor! What's wrong with this picture? Well, actually nothing. CygnusEd Professional Release 3 has proved to be more than worth the price. Text editors are distinguished from word processors in that they are not WYSIWYG. They usually use fixed-spaced fonts and are used for computer languages and script files.

CygnusEd Professional has all of the features you would expect—cut-and-paste editing, search and replace, etc. But some features go beyond the normal implementation, like the search function that has a "history," saving you the trouble retyping previously used search parameters. CygnusEd Professional also allows you to cut out a rectangular area of text, which is very handy for extracting text arranged in columns, such as directory listings.

This program features multiple view windows, bookmarks, ARexx, multiple-level undo and redo, and wordwrap. Extensive keyboard shortcuts are available, plus macro capabilities. Using macros you can reassign keystrokes to emulate other editors. This is a blessing because CygnusEd Professional uses several nonstandard keystrokes.

CygnusEd Professional fully supports the Amiga Clipboard with 256 separate buffers. It also includes MS-DOS carriage return

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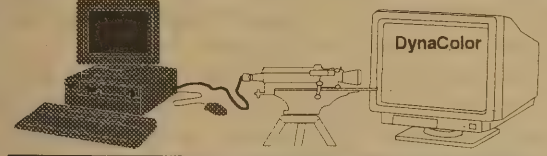

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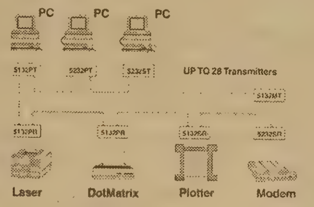

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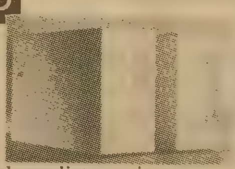

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No other text editor will provide anything even close to CygnusEd Professional—it is great for programming, script editing, BBS message composition, and program documentation files, plus you get a 240-page manual! A must for the serious Amiga user. (ASDG, Inc., 925 Stewart St., Madison, WI 53713. 608/273-6585)

DIRECTORY OPUS V4

Published By: Inovatronics, Inc.
List Price: $99.95
Reviewed By: Douglas J. Nakakihara

Even if you already use a directory utility program, you should consider Inovatronics' Directory OPUS. This program does everything but the dishes! Its features include displaying images, animations, fonts, and text and hex files; playing audio samples and music modules; and running executable programs, ARexx scripts, and CanDO decks. This is in addition to typical file management tasks like copying and deleting files.

Directory OPUS uses the familiar two-window approach, each displaying the contents of a particular directory. It offers file name and file contents search with full pattern matching. A powerful feature is its ability to learn and recognize file types and execute the appropriate action. For example, double-clicking on an image file can automatically display the image.

Although many functions are built in, you can configure Directory OPUS in as many ways as you can think of. The main screen has forty-two configurable buttons responding to right or left mouse button clicks, giving eighty-four possible events. The total number of button banks is limited only by memory! You can create custom hot keys and menus too. Use your personal favorite utilities to display images, play sounds, etc. instead of their built-in counterparts.

Directory OPUS is a powerful application and I've only covered the basics. Use it straight out of the box or configure it to your heart's content. The nearly 300-page manual provides thorough explanation of all operations including ARexx control. (Inovatronics, Inc., 8499 Greenville Ave., Suite 209B, Dallas, TX 75231-2499. 214/340-4991)

TURBOPRINT PROFESSIONAL 2.0

Published By: Inovatronics, Inc.
List Price: $129.95
Reviewed By: Douglas J. Nakakihara

AmigaDOS has improved considerably since the early days of v1.x. However, refinements to the Amiga's printer support have been slow in coming. TURBOprint enhances the printing process by providing significantly improved printer control. Essentially, this program replaces the normal Amiga printer interface and is therefore compatible with most programs.

Printing color pictures on a black-and-white printer is a common dilemma for Amiga users. TURBOprint tackles the conversion process with fourteen different dithering patterns and each pattern can be optionally rotated by 90 degrees. Two levels of smoothing are selectable to reduce jaggies. Aspect ratio adjustment is also fea-

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continued from page 84

slow processors. But the embedded market is huge, and moving to more and more high-performance microprocessors.

A couple of consumer applications are the scene of huge new platform battles. One is these is PDA/Personal Communicator/Mobile Companion computers, whatever you want to call them—some sort of thing that you can carry around with you that has your phone directory in it, and you can take notes on it, and you can do communications with it.

I am a believer in that market. I think the existing products clearly are deeply flawed, but it's more their implementations that are flawed than the concept. I think they're sort of at the stage PCs were at in the early '70s, when we were looking at Northstars and Cromemcos; eventually the IBM PC and the Macintosh of PDAs are going to emerge, and it's going to be a very, very big market. And it requires entirely different software than desktop computers, and therefore is open to all architectures. It does not have the barrier to entry that the desktop market has, because it needs new software no matter what.

It also needs to draw a lot less power, which could give different chips an advantage.

Right, although those same requirements exist for notebook computers, so there are x86 implementations focusing on the same requirements. And the x86 architecture will be a player in the PDA market, there's no doubt about that, but they're going into that market with a little bit of a disadvantage instead of the overwhelming advantage that they have in the desktop space.

I think that's one of the areas to watch, and the other one is the set-top cable boxes, which is turning into a platform battle. Everybody's doing them. Intel and Microsoft are doing this deal with General Instruments. SGI has the Nintendo deal and is also involved with one of the cable companies. Motorola, with the PowerPC stuff, has a deal with one of the cable companies. There's half a dozen efforts there, and you need about a three-dimensional picture to chart all the alliances and who's working with whom. I think that also is in a very early stage, and by the time it's real, everything will look different than it does today.

But it's clear that there's an enormous opportunity there, in that everybody's got TVs, you've got this cable coming into your house, and the bandwidth on that cable is largely wasted. There's so much more that could be happening.

The home computer, I think, is going to be the TV, which also is going to do other things. Some of them are very mundane in a sense; without requiring any new infrastructure, without requiring really anything significant that's not already existing today, you could make enormous advances in ease of use and general usability of TVs.

For example, you could imagine where at the beginning of the week you push some button and get a chart on your screen that's like those little at-a-glance pages in the *TV Guide,* that lists all the channels down one side and all the times across, and what the shows are. You could look at that and just point to the shows you wanted.

Or maybe it won't worry about what time things are being broadcast, since that won't matter anymore; it'll just list things by category and you'll just point to the things you're interested in. And then automatically the system will just record all those things, and then when you want to watch something, you'll just go over and say, "Give me the list of things that are recorded." You'll get a list, you'll point to what you want to watch, and it'll play.

The only piece of technology missing from that scenario today is you need a little low-cost 10GB storage medium, but in a few years that's not going to be a problem either. Storage is on this wonderful curve where it just keeps getting cheaper and cheaper.

That's just the most pedestrian of things, but I think it would be fairly compelling as a use for computing power inside your TV. And then you can get into all the interactive stuff, and the information delivery; clearly there's going to be another big platform battle there, where everybody's going to want their processor to be the processor in that set-top box, because that box will also run video games. You'll go buy CD-ROM games that will go into that box on your set-top, and your TV will do things for you without even using any broadcast programming.

In a way, it sounds like what people were trying to do with Atari game machines almost twenty

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Prices Subject To Change w/o Notice •Cashiers Check •Money Order •Visa/Master/ATM Accepted tured. For dot matrix printers there are special pin-control features to minimize banding common on these types of printers.

Gamma correction is available to adjust the reproduction of grayscale levels. TURBOprint will even do color separation. If you're using a color printer, there is user-definable color correction support. Also featured is the ability to do full or partial screen dumps to file or printer. Multiple-page poster printing is available as well.

Drivers for most of the popular printers are supplied, of course, including Epson and HP. For printers that are not specifically supported, the readme file includes alternate suggestions.

The difference that TURBOprint makes in printing graphics is phenomenal compared to the standard AmigaDOS output. If you print a lot of graphics, you should check out this product. (Inovatronics, Inc., 8499 Greenville Ave., Suite 209B, Dallas, TX 75231-2499. 214/340-4991)

TV PAINT PROFESSIONAL 2.0

Published By: MacroSystemUS
List Price: $449 Retina version ($499 multiple graphics cards version, $899 bundled with Retina card)
Reviewed By: Douglas J. Nakakihara

TV Paint Professional 2.0 is the perfect 24-bit paint program for owners of MacroSystemUS's Retina card, A Video, DMI Resolver, Harlequin, IV24, Rambrandt, Visiona, or VD2001 graphics cards. All of the basic painting tools are accessible via the floating tool window, including freehand, line, rectangle, circle, and ellipse drawing. Bitmapped-text input, brush cut and paste, fills, airbrush, masking, spare screen, and undo are also featured. Many of the tools and keyboard equivalents operate in a familiar DPaint-like manner. The floating magnification window is very cool.

Four customizable 256-color palettes are available on demand, and palettes can be saved and loaded as files. TV Paint also features chalk and pencil drawing tools, anti-aliasing, and spline-based drawing. Drawing modes include color, stamp, smooth, blur, shift, smear, trans (spare image "rub-through"), colorize, dithering, and grain.

Image processing effects like brighten, darken, relief, negative, blur, sharpen, and outline are possible with TV Paint. Brush wrapping and perspective manipulation are also supported. Custom color ranges with direction vector provide beautiful gradient fills. For effects like compositing and embossed transparent logos use the 8-bit alpha channel.

Many file formats are supported, including ILBM, DEEP, JPEG, and TGA. TV Paint can also control a VLab, IV24, or Rambrandt framegrabber. Additionally, ARexx is fully supported.

Although the manual needs editing, it is very thorough. The Wacom, Summa, and Kurta touch tablets can be used (pressure sensitivity supported). Requires OS2.0 or greater, a 68020 or better with math coprocessor, and at least 8MB of RAM. Uses joystick dongle for copy protection. (MacroSystemUS, 17019 Smugglers Cove, Mt. Clemens, MI 48038. 313/263-0095)

BOOK REVIEW

NAVIGATING THE INTERNET

Written By: Mark Gibbs and Richard Smith
Published By: SAMS Publishing

Continued on page 246

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years ago. Why is it going to be real now?

Well, you can look at Sharp Wizards and say, "Gee, Sharp Wizards have been around for years, and they never took over; why are these other PDAs going to take over?" All these things provide some utility, and at the same time they are a hindrance. For me personally, for example, the hindrance of using a Sharp Wizard is significantly greater than the value it delivers to me, so I'm not going to do it.

The same is true with the Newton today. The Newton comes closer, and if Newton just had good handwriting recognition it would actually be there for me. For me,- a Newton with highly accurate handwriting recognition would provide more than enough value for me that I would carry it around all the time.

A box on top of the TV with the sort of computing power and storage that you could afford to deliver to a consumer ten or fifteen years ago was not going to provide enough utility for them to want to bother with it. Now, when for the sort-of-accessible consumer price of a couple hundred dollars, you can put a significant amount of computing power and a significant amount of storage there, I think that makes the picture very different.

What about generic but somewhat specialized stuff like compression and graphics accelerators and stuff like that? Where do you see that stuff going?

Graphics acceleration is an interesting phenomenon, because the technology's certainly been there for a long time. There were some companies that tried very hard to sell graphics accelerators in the days before Windows, and could never make a decent business of it because every application program that had a graphical interface needed its own driver written for every single accelerator.

For the Mac it was easier because it was more standard?

Well, the Mac has never really had accelerated graphics successfully, because what's built into the system has been adequate for most people. But in the PC space, people did try to build these accelerators, but it ended up being an accelerator for AutoCAD, not really a general-purpose accelerator.

Windows completely changed the world from the graphics point of view, because now you can build any arbitrary piece of graphics hardware, and you just write a Windows driver for it, and then all the applications talk to Windows, so it immediately works with every Windows application.

That's spawned an enormous business in graphics accelerators, and I think for the next few years that will continue. Ironically, though, I think that's a short-term business. The reason it goes away is that as processors get faster, if you just have an intelligently architected system—like not a VGA controller, and not an ISA bus, but just a simple frame buffer, just a memory that has one bit for every dot on the screen, and you just provide a fast direct connection between the processor and that memory—you're going to be able to do graphics that are essentially instant from the user's point of view, all in software, so there's going to be no value in having a hardware accelerator.

Maybe a hardware accelerator for things like 3-D rendering would then make sense. It would be a different class of accelerator, but today's accelerators will be obsolete once processors move through another couple of generations. Certainly as you look toward the end of the decade, the accelerator business as it exists today goes away.

To some degree the same thing will happen with compression. We're at a point in the evolution of processors now where you can do some compression in software with reasonable performance. You can even do video compression and decompression all in software, like the Indeo video, but it's ugly.

So people who want reasonable quality video today will pay for a hardware compression or decompression chip. People that want something that's sort of acceptable but cheap will go ahead and use the pure software solution. With another couple generations of processor technology, that pure software solution is going to be delivering to you broadcast-TV-quality video, and relatively few people are going to be willing to pay for extra hardware to move it up a notch.

I think it's sort of an interesting period of time. This next five years will be the heyday of things like graphics accelerators and compression chips, but in the long term they're either going to have to find a yet more complex task that still remains a step beyond what you can do in software with acceptable performance, or they're going to have to find a different business. ■

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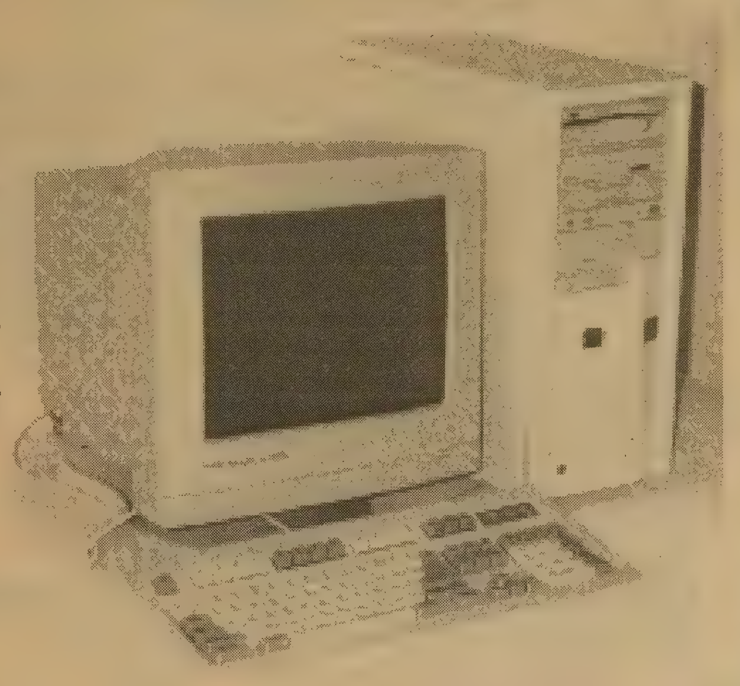

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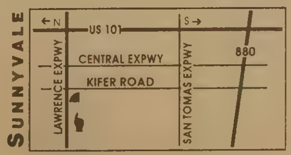

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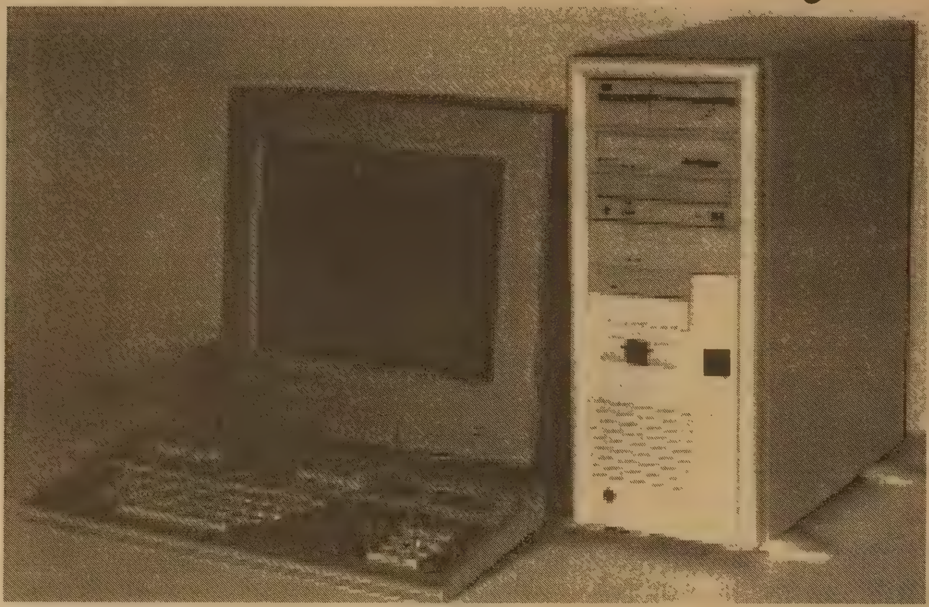

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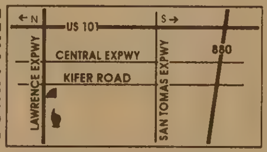

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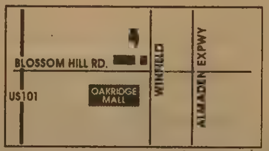

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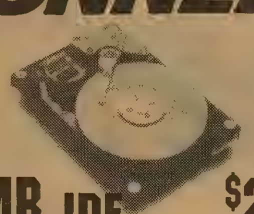

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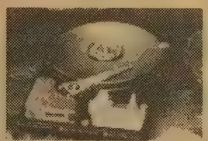

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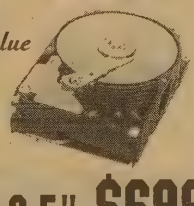

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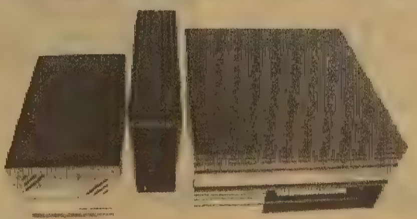

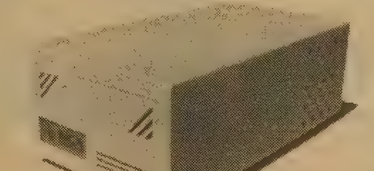

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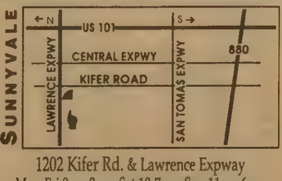

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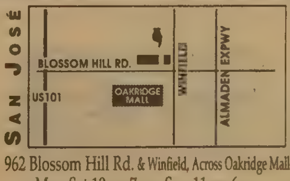

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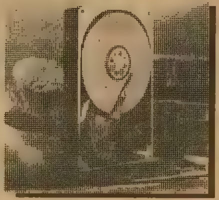

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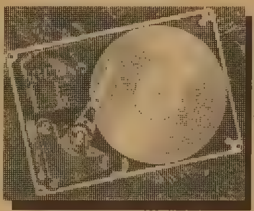

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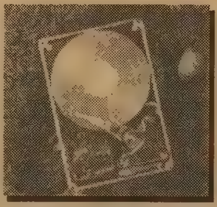

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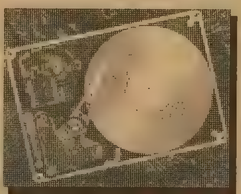

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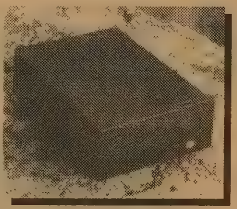

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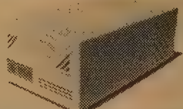

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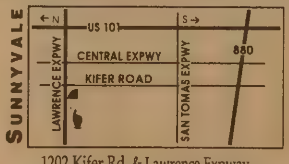

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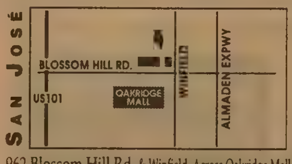

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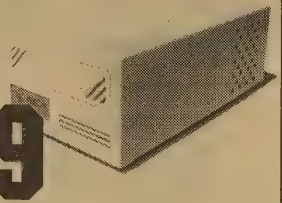

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525MB	ST3600N	256K	12ms	3.5X1"	$679	$799
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1.0GB	**ST31200N**	**256K**	**10ms**	**3.5"x1"**	**$1089**	**$1199**
1.4GB	ST41651	256K	15ms	FH	$1189	$1389
1.9GB	ST42100N	256K	12.9ms	FH	$1489	$1689
2.1GB	ST42400N	256K	11ms	FH	$1749	$1949
2.1GB	ST12400N	256K	10ms	3.5"	$CALL	$2029
2.9GB	ST43400N	512K	11ms	FH	$2299	$2499
2.9GB	ST43401N	512K	Fast-Wide SCSI-II	5.25	$2499	$3699

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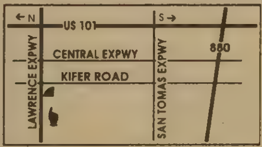

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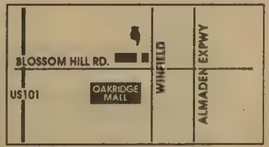

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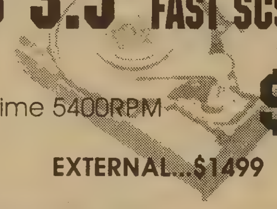

- ▶ MC2217S
- ▶ 10ms Seek Time 5400RPM
- ▶ 3.5"

EXTERNAL...$1499 **$1389**

IDE

	MODEL	RPM	SPEED	SIZE	INTERNAL
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1.75GB	MC2217A	5400	10ms	3.5"	....$1489

SCSI

	MODEL	RPM	SPEED	SIZE	INTERNAL	EXTERNAL
670MB	MC1624	3600	14ms	HH	.....$729	.....$849
1.0GB	MC2210	5400	10ms	3.5"	....$969	...$1089
1.0GB	MC1598	3600	15ms	FH	.....$969	...$1169
1.3GB	**MC1528**	**3600**	**15ms**	**FH**	**.....$999**	**..$1199**
1.4GB	MC1908	5400	11ms	FH	....$1699	1899
1.75GB	MC2217	5400	10ms	3.5"	...$1389	..$1499
1.8GB	MC1548	3600	14ms	FH	....$1499	..$1699
2.0GB	MC1926	5400	11ms	FH	....$1899	..$2099
3.0GB	MC1936	5400	11ms	FH	....$2499	..$2699

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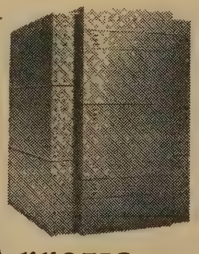

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M2624FA

- ▶ 3.5" HH Drive
- ▶ 12ms Seek Time
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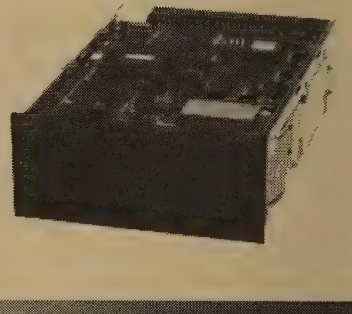

IDE

CAPACITY	M/N	CACHE	SPEED	SIZE	PRICE
520MB	M2624T	64K	12ms	3.5"	......$639

SCSI

CAPACITY	M/N	CACHE	SPEED	SIZE	INTERNAL	EXTERNAL
425MB	M2623FA	240K	11ms	3.5"	....$549	....$669
520MB	M2624FA	240K	12ms	3.5"	....$569	....$689
1.0GB	M2694ESA	256K	10ms	3.5"	....$879	....$999
2.0GB	**M2654SA**	**256K**	**12ms**	**FH**	**...$1499**	**.$1699**

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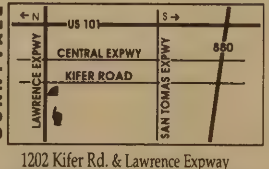

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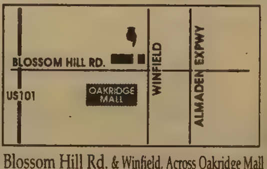

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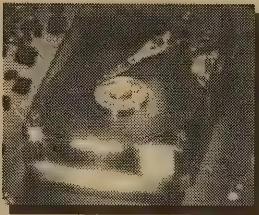

- HP C2247
- 10.5ms sek time
- 5400 RPM
- 300000 MTBF
- 5-Yr Warranty
- Up to 24 Mbits/s transfer rate
- Up to 10 Mbytes/s (synchronous)

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- 8.9ms seek time
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- 57 Mbits/sec transfer rate
- Up to 10Megabytes/sec (synchronous)

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- 300,000 MTBF
- 5-Yr Warranty
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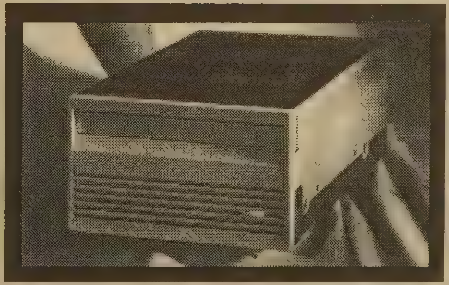

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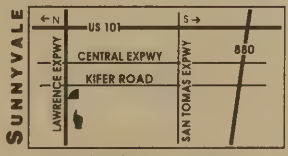

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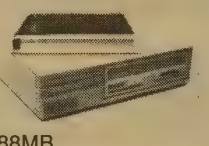

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- ▶ 14ms SEEK TIME
- ▶ SCSI

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- ▶ EXTERNAL SCSI DRIVE
- ▶ 105MB CARTRIDGE
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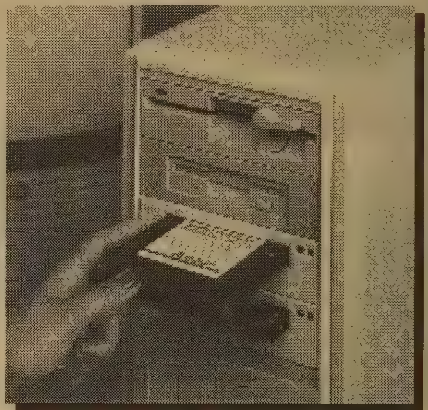

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> **PC Magazine, 10/26/93.**
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> **InfoWorld, 7/19/93**

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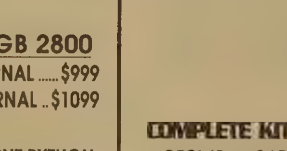

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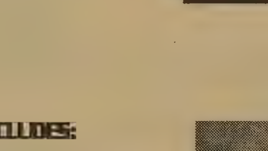

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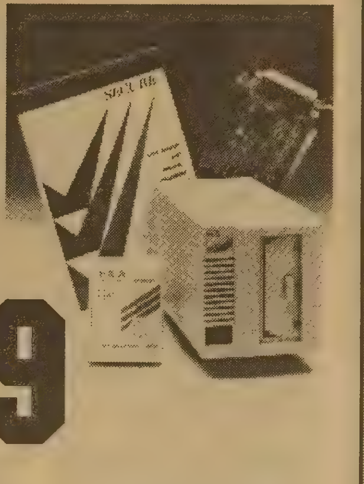

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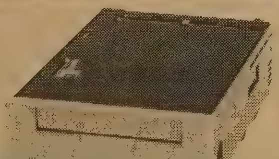

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- ▶ 2GB Native Capacity
- ▶ 233Kb/Sec Transfer Rate
- ▶ 20ms Avg. Access Time
- ▶ 3.5" Form Factor

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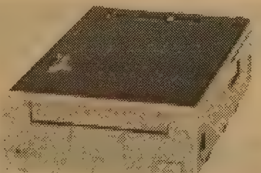

3.5"

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- ▶ 466Kb/Sec Transfer Rate
- ▶ 20 Sec Avg. Access Time
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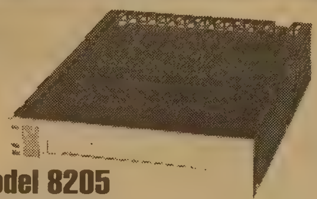

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- ▶ Intelligent IDRC algorithm data compression
- ▶ 5GB capacity at 500Kb/Sec (compressed)
- ▶ MTBF 80,000 hours

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2.5GB EXB-8200

2.5GB model 8200

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- ▶ On-Board Error Correct Code & Recovery Products
- ▶ 256K buffer
- ▶ 246Kb/Sec Transfer Rate

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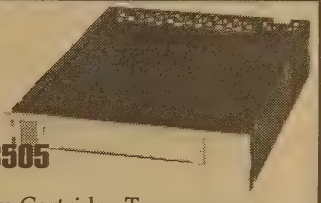

5GB model 8505

- ▶ Half-height, 8mm Cartridge Tape
- ▶ Intelligent IDRC algorithm data compression
- ▶ 10GB capacity at 1MB/Sec (compressed)
- ▶ MTBF 80,000 hours

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External..........$2599

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5GB model 8500

- ▶ Full-Height, 8mm Cartridge Tape
- ▶ 500Kb/Sec Transfer Rate (up to 4MB/Sec Synchronous)
- ▶ 1MB Cache Buffer

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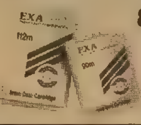
External..........$2649



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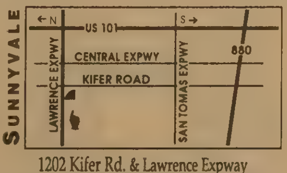

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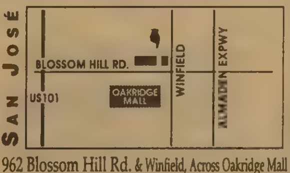

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- 0.1ms effective access time on average

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- 4HD/2FD
- Holds 512K (expandable up to 16MB)
- 5MB/Second transfer rate
- 0.3ms effective access time on average

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- Uses standard 256K, 1MB, 4MB SIMMS Modules-expandable to 16MB (0MB on-board)
- 0.3ms effective access time on average

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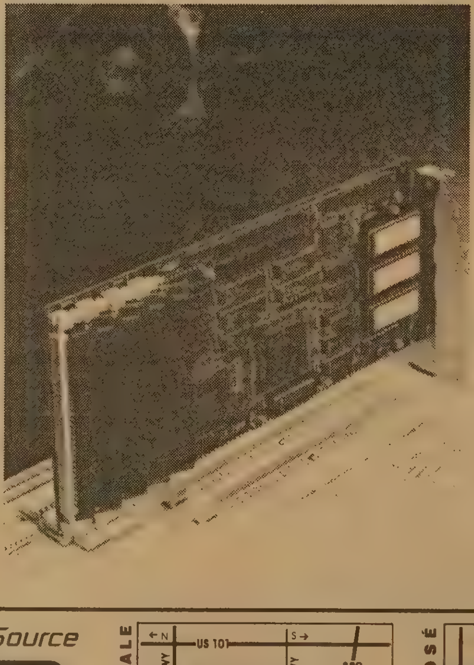

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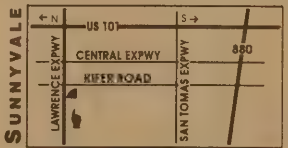

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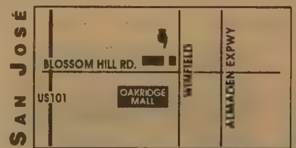

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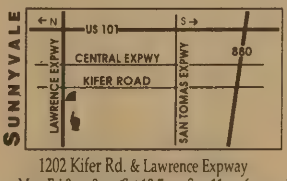
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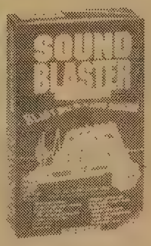

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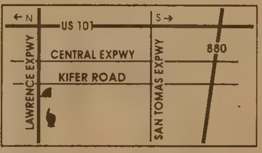

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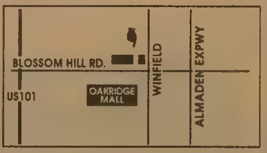

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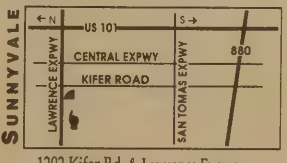

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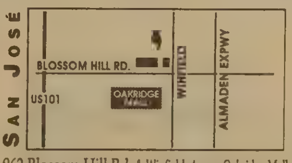

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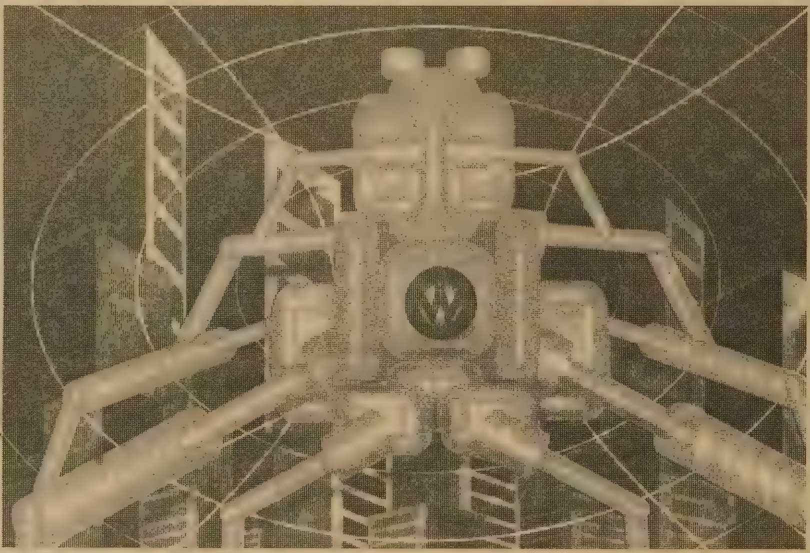

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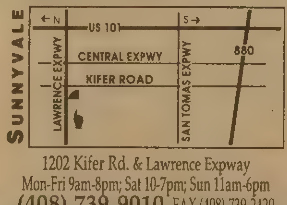
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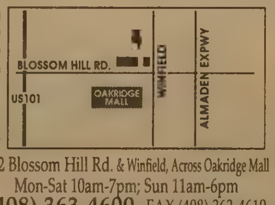
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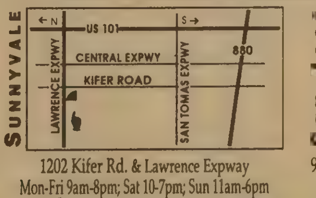

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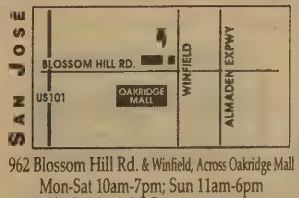

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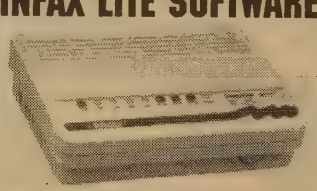

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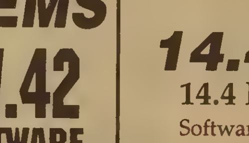

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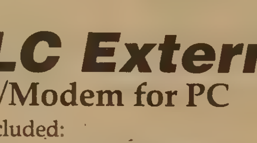

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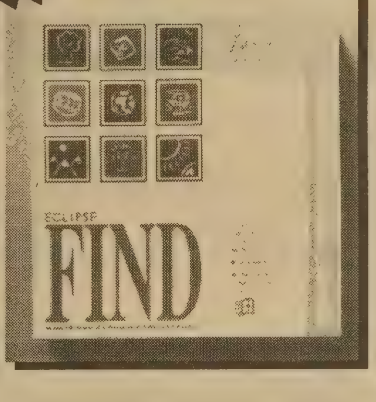
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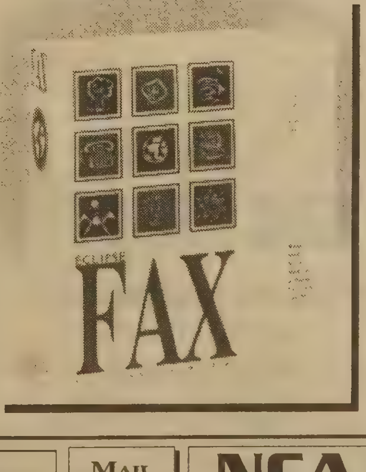
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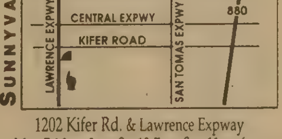
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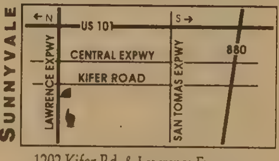

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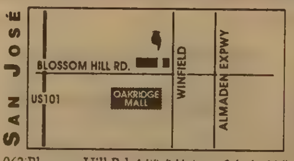

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continued from page 30

organized ring of child molesters, but I suppose one or two might be out there. And the last time we got into a shooting match with another nation, we beat them by a kill ratio of about 2300 to 1.

Even if these are real threats, was enhanced wiretap the best way to combat them? Apparently, it hasn't been in the past. Over the last ten years the average total nationwide number of admissible state and federal wiretaps has numbered less than 800. Wiretap is not at present a major enforcement tool, and is far less efficient than the informants, witnesses, physical evidence, and the good old fashioned detective work they usually rely on.

Still unnamed, undescribed, and increasingly unimaginable were the escrow agents. Questions about the inviolability of the depositories were met with something like, "Don't worry, they'll be secure. Trust us."

(It's worth noting that the World Trade Center bombing case unraveled, not through wiretaps, but with the discovery of the axle serial number on the van which held the explosives.)

Despite all these questions, both unasked and unanswered, Clipper continues (at the time of this writing) to sail briskly toward standardhood, the full wind of government bearing her along.

On July 30, NIST issued a request for public comments on its proposal to establish Clipper/Skipjack as a Federal Information Processing Standard (FIPS). All comments were due by September 28, and the government seems unwilling to delay the process despite the lack of an overall guiding policy on crypto. Worse, they are putting a hard sell on Clipper/Skipjack without a clue as to who might be escrow holders upon whose political acceptability the entire scheme hinges.

Nor have they addressed the central question: Why would a criminal use a key escrow device unless he were either very stupid—in which case he'd be easily caught anyway—or simply had no choice.

All this leads me to an uncharacteristically paranoid conclusion:

THE GOVERNMENT MAY MANDATE KEY ESCROW ENCRYPTION AND OUTLAW OTHER FORMS

It is increasingly hard for me to imagine any other purpose for the Clipper/Skipjack operetta if not to prepare the way for the restriction of all private cryptographic uses to a key escrow system. If I were going to move the American people into a condition where they might accept restrictions on their encryption, I would first engineer the widespread deployment of a key escrow system on a voluntary basis, wait for some blind sheik to slip a bomb plot around it and then say, "Sorry, folks this ain't enough, it's got to be universal."

Otherwise, why bother? Even its most ardent proponents admit that no intelligent criminal would trust his communications to a key escrow device. On the other hand, if nearly all encrypted traffic were Skipjack-flavored, any transmission encoded by some other algorithm would stick out like a licorice Dot.

In fact, the assumption that Cyberspace will roar one day with Skipjack babble lies behind the stated reason for the secrecy for the algorithm. In their Interim Report, the Skipjack review panel puts it this way:

"Disclosure of the algorithm would permit the construction of devices that fail to properly implement the LEAF [or Law Enforcement Access Field], while still interoperating with legitimate Skipjack devices. Such devices would provide high-quality cryptographic security without preserving the law enforcement access capability that distinguishes this cryptographic initiative."

In other words, they don't want devices or software out there that might use the Skipjack algorithm without depositing a key with the escrow holders. (By the way, this claim is open to question. Publishing Skipjack would not necessarily endow anyone with the ability to build an interoperable chip.)

Then there was the conversation I had with a highly placed official of the National Security Council in which he mused that the French had, after all, outlawed the private use of cryptography, so it weren't as though it couldn't be done. (He didn't suggest that we should also emulate France's policy of conducting espionage on other countries' industries, though widespread international use of Clipper/Skipjack would certainly enhance our ability to do so.)

Be that as it may, France doesn't have a Bill of Rights to violate, which it seems to me that restriction of cryptography in America would do on several counts.

Mandated encryption standards would fly against the First Amendment, which surely protects the manner of our speech as clearly as it protects the content. Whole languages (most of them patois) have arisen on this planet for the purpose of making the speaker unintelligible to authority. I know of no instance where, even in the oppressive colonies where such languages were formed, the slave-owners banned their use.

Furthermore, the encryption software itself is written expression, upon which no ban may be constitutionally imposed. (What, you might ask then, about the constitutionality of restrictions on algorithm export. I'd say they're being allowed only because no one ever got around to testing from that angle.)

The First Amendment also protects freedom of association. On several different occasions, most notably *NAACP v. Alabama, ex rel. Patterson*, and *Talley vs. California*, the courts have ruled that requiring the disclosure of either an organization's membership or the identity of an individual could lead to reprisals, thereby suppressing both association and speech.

Certainly in a place like Cyberspace where everyone is so generally "visible," no truly private "assembly" can take place without some technical means of hiding the participants.

It also looks to me as if the forced imposition of a key escrow system might violate the Fourth and Fifth Amendments.

The Fourth Amendment prohibits secret searches. Even with a warrant, agents of the government must announce themselves before entering and may not seize property without informing the owner. Wiretaps inhabit a grayish area of the law in that they permit the secret "seizure" of an actual conversation by those actively eavesdropping on it. The law does not permit the subsequent secret seizure of a record of that conversation. Given the nature of electronic communications, an encryption key opens not only the phone line but the filing cabinet.

The man who claims to have designed Clipper's basic specs, Acting NIST Director Ray Kammer, recently said, "It's obvious that anyone who uses Clipper for the conduct of organized crime is dumb." No kidding. At least so long as it's voluntary.

Finally, the Fifth Amendment protects individuals from being forced to reveal self-incriminating evidence. While no court has ever ruled on the matter vis a vis encryption keys, there seems something involuntarily self-incriminating about being forced to give up your secrets in advance. Which is, essentially, what mandatory key escrow would require you to do.

For all these protections, I keep thinking it would be nice to have a constitution like the one just adopted by our largest possible enemy, Russia. As I understand it, this document explicitly forbids governmental restrictions on the use of cryptography.

For the moment, we have to take our comfort in the fact that our government—or at least the parts of it that state their intentions—avows both publicly and privately that it has no intention to impose key escrow cryptography as a mandatory standard. It would be, to use Podesta's mild word, "imprudent."

But it's not Podesta or anyone else in the current White House who worries me. Despite their claims to the contrary, I'm not convinced they like Clipper any better than I do. In fact, one of them—not Podesta—called Clipper "our Bay of Pigs," referring to the ill-fated Cuban invasion cooked up by the CIA under Eisenhower and executed (badly) by a reluctant Kennedy Administration. The comparison may not be invidious.

It's the people I can't see who worry me. These are the people who actually developed Clipper/Skipjack and its classified algorithm, the people who, through export controls, have kept American cryptography largely to themselves, the people who are establishing in secret what the public can or cannot employ to protect its own secrets. They are invisible and silent to all the citizens they purportedly serve save those who sit on the Congressional intelligence committees.

In secret, they are making for us what may be the most important choice that has ever faced American democracy, that is, whether our descendants will lead their private lives with unprecedented mobility and safety from coercion, or whether every move they make, geographic, economic, or amorous, will be visible to anyone who possesses whatever may then constitute "lawful authority."

WHO ARE THE LAWFUL AUTHORITIES?

Over a year ago, when I first fell down the rabbit hole into Cryptoland, I wrote a *Communications of the ACM* column called "Decrypting the Puzzle Palace." In it, I advanced what I then thought a slightly paranoid thesis, suggesting that the NSA-guided embargoes on robust encryption software had been driven not by their stated justification (keeping good cryptography out of the possession of foreign military adversaries) but rather by restricting its use by domestic civilians.

In the course of writing that piece, I spoke to a number of officials, including former CIA Director Stansfield Turner and former NSA Director Bobby Ray Inman, who assured me that using a military organization to shape domestic policy would be "injudicious" (as Turner put it), but no one could think of any law or regulation that might specifically prohibit the NSA from serving the goals of the Department of Justice.

But since then I've learned a lot about the hazy Post-Reagan/Bush lines between law enforcement and intelligence. They started redrawing the map of authority early in their administration with Executive Order 12333, issued on December 4, 1981 (Federal Register #: 46 FR 59941). This sweeping decree defines the duties and limitations of the various intelligence organizations of the United States and contains the following language:

"1.4 The Intelligence Community. The agencies within the Intelligence Community shall...conduct intelligence activities necessary for the...protection of the national security of the United States, including:...

"(c) Collection of information concerning, and the conduct of activities to protect against, intelligence activities directed against the United States, international terrorist and international narcotics activities, and other hostile activities directed against the United States by foreign powers, organizations, persons, and their agents..." Further, in Section 2.6, Assistance to Law Enforcement Authorities, agencies within the Intelligence Community are "authorized to...participate in law enforcement activities to investigate or prevent clandestine intelligence activities by foreign powers, or international terrorist or narcotics activities."

In other words, the intelligence community was specifically charged with investigative responsibility for international criminal activities in the areas of drugs and terrorism.

Furthermore, within certain fairly loose guidelines, intelligence organizations are "authorized to collect, retain or disseminate information concerning United States persons" that may include "incidentally obtained information that may indicate involvement in activities that may violate federal, state, local or foreign laws."

Given that the NSA monitors a significant portion of all the electronic communications between the United States and other countries, the opportunities for "incidentally obtaining" information that might incriminate Americans inside America are great.

Furthermore, over the course of the Reagan/Bush administration, the job of fighting the War on Some Drugs gradually

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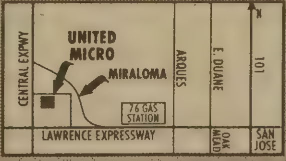

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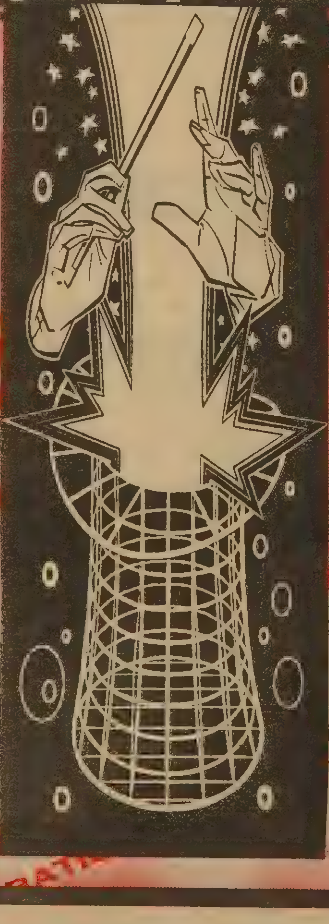

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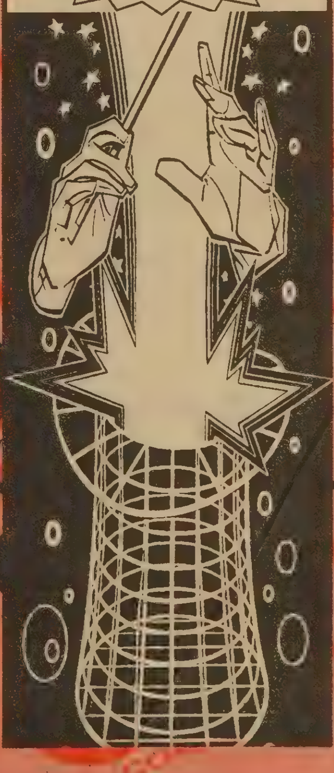

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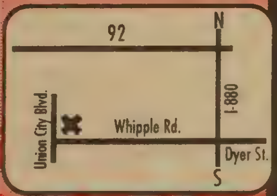

spread to every element of the Executive Branch.

Even the Department of Energy is now involved. At an Intelligence Community conference last winter I heard a proud speech from a DOE official in which he talked about how some of the bomb-designing supercomputers at Los Alamos had been turned to the peaceful purpose of sifting through huge piles of openly available data—newspapers, courthouse records, etc.—in search of patterns that would expose drug users and traffickers. They are selling their results to a variety of "lawful authorities," ranging from the Southern Command of the U.S. Army to the Panamanian Defense Forces to various County Sheriff's Departments.

"Fine," you might say. "Drug use is an epidemic that merits any cure." But I would be surprised if there's anyone who will read this sentence who has broken no laws whatever. And it's anybody's guess what evidence of other unlawful activities might be "incidentally obtained" by such a wide net as DOE is flinging.

The central focus that drugs and terrorism have assumed within the intelligence agencies was underscored for me by a recent tour of the central operations room at the CIA. There, in the nerve center of American intelligence, were desks for Asia, Europe, North America, Africa and "Middle East/Terrorism," and "South America/Narcotics." These bogeymen are now the size of continents on the governmental map of peril.

Given this perception of its duties, the NSA's strict opposition to the export of strong cryptographic engines, hard or soft, starts to make more sense. They are not, as I'd feared, so clue-impaired as to think their embargoes are denying any other nation access to good cryptography. (According to an internal Department of Defense analysis of crypto policy, it recently took three minutes and fourteen seconds to locate a source code version of DES on the Internet.)

Nor do they really believe these policies are enhancing national security in the traditional, military sense of the word, where the US is, in any case, already absurdly over-matched to any national adversary, as was proven during the Gulf War.

It's the enemies they can't bomb who have them worried, and they are certainly correct in thinking that the communications of drug traffickers and whatever few terrorists as may actually exist are more open to their perusal than would be the case in a world where even your grandmother's phone conversations were encrypted.

And Clipper or no Clipper, such a world would be closer at hand if manufacturers hadn't known that any device that embodies good encryption would not be fit for export.

But with Clipper/Skipjack, there is a lot that the combined forces of government will be able to do to monitor all aspects of your behavior without getting a warrant. Between the monitoring capacities of the NSA, the great data-sieves of the Department of Energy, and the fact that, in use, each chip would continually broadcast the whereabouts of its owner, the government would soon be able to isolate just about every perpetrator among us.

I assume you're neither a drug-user nor a terrorist, but are you ready for this? Is your nose that clean? Can it be prudent to give the government this kind of corrupting power?

I don't think so, but this is what will happen if we continue to allow the secret elements of government to shape domestic policy as though the only American goals that mattered were stopping terrorism (which seems pretty well stopped already) and winning the War on Some Drugs (which no amount of force will ever completely win).

Unfortunately, we are not able to discuss priorities with the people who are setting them, nor do they seem particularly amenable to any form of authority. In a recent discussion with a White House official, I asked for his help in getting the NSA to come out of its bunker and engage in direct and open discussions about crypto embargoes, key escrow, the Skipjack algorithm, and the other matters of public interest.

"I'll see what we can do," he said.

"But you guys are the government," I protested. "Surely they'll do as you tell them."

"I'll see what we can do," he repeated, offering little optimism.

That was months ago. In the meantime, the NSA has not only remained utterly unforthcoming in public discussions of crypto policy, it has unlawfully refused to comply with any Freedom of Information Act requests for documents in this area.

It is time for the public to reassert control over their own government. It is time to demand that public policy be made in public by officials with names, faces, and personal accountability.

When and if we are able to actually discuss crypto policy with the people who are setting it, I have a list of objectives that I hope many of you will share. They are as follows:

A POLICY ON CRYPTOGRAPHY

1. There should be no law restricting any use of cryptography by private citizens.

2. There should be no restriction on the export of cryptographic algorithms or any other instruments of cryptography.

3. Secret agencies should not be allowed to drive public policies.

4. The taxpayer's investment in encryption technology and related mathematical research should be made available for public and scientific use.

5. The government should encourage the deployment of widespread encryption.

6. While key escrow systems may have purposes, none should be implemented that places the keys in the hands of government.

7. Any encryption standard to be implemented by the government should be developed in an open and public fashion and should not employ a secret algorithm.

And last, or perhaps, first...

8. There should be no broadening of governmental access to private communications and records unless there is a public consensus that the risks to safety outweigh the risks to liberty and will be effectively addressed by these means.

If you support these principles, or even if you don't, I hope you will participate in making this a public process. And there are a number of actions you can take in that regard.

If you belong to or work for an organization, you can encourage that organization to join the Digital Privacy Working Group. To do so they should contact EFF's Washington office at:

Electronic Frontier Foundation
1001 G Street, NW, Suite 950 East
Washington, DC 20001
(202)347-5400
Fax (202)393-5509
eff@eff.org

I also encourage individuals interested in these issues to join EFF, Computer Professionals for Social Responsibility, or one of the related local organizations which have sprung up around the country. For the addresses of a group in your area, contact EFF. ■

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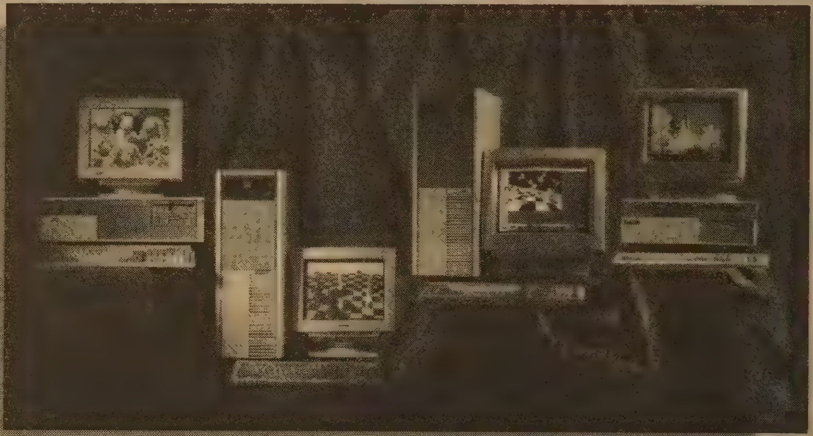

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486DLC-33MHz w/ 128Kb	$128
486DLC-40MHz w/ 128Kb	$148
486sx-25MHz w/ 256Kb expandable to 512Kb	$188
486DX-33MHz w/ 256Kb expandable to 512kb	$378
486DX2-50MHz w/ 256Kb expandable to 512kb	$418
486DX2-66MHz w/ 256Kb expandable to 512kb	$573

VESA Local Bus

Opti 386DX-40MHz w/ 128Kb	$138
Opti 486DLC-33MHz w/ 128Kb	$148
Opti 486DLC-40MHz w/ 128Kb	$168
Opti 486SX-25MHz w/ 128Kb	$168
Opti 486SX-33MHz w/ 128Kb	$218
Opti 486DX-33MHz w/ 128Kb	$348
Opti 486DX2-50MHz w/ 128Kb	$398
Opti 486DX2-66MHz w/ 128Kb	$548
IBM 486SLC2-66MHz w/ 64Kb	$268
SIS 486SX-25MHz w/ 256Kb (ZIF Socket)	$208
SIS 486SX-33MHz w/ 256Kb (ZIF Socket)	$248
SIS 486DX-33MHz w/ 256Kb (ZIF Socket)	$398
SIS 486DX2-50MHz w/ 256Kb (ZIF Socket)	$448
SIS 486DX-50MHz w/ 256Kb (ZIF Socket)	$548
SIS 486DX2-66MHz w/ 256Kb (ZIF Socket)	$598
Orchid Super-Board 486DX-33MHz w/ 256Kb	$398
Orchid Super-Board 486DX2-50MHz w/ 256Kb	$448
Orchid Super-Board 486DX2-66MHz w/ 256Kb	$598
AMI Super Voyager II 486DX-33MHz w/ 256Kb	$688
AMI Super Voyager II 486DX-50MHz w/ 256Kb	$838
AMI Super Voyager II 486DX2-66MHz w/ 256Kb	$888
AMI Enterprise IV EISA VLB 486DX-33 w/ 256Kb	$878
AMI Enterprise IV EISA VLB 486DX-50 w/ 256Kb	$1038
AMI Enterprise IV EISA VLB 486DX2-66 w/ 256Kb	$1098
Hint EISA VLB 486DX-33MHz w/ 256Kb	$398
Hint EISA VLB 486DX2-50MHz w/ 256Kb	$458
Hint EISA VLB 486DX-50MHz w/ 256Kb	$658
Hint EISA VLB 486DX2-66MHz w/ 256Kb	$598
Other	$Call

INTERFACE CARDS

IDE (2HD & 2FD) 2s, 1p, 1g	$15
IDE (4FD & 2HD) Support 2.88	$28
IDE VLB (2HD & 2FD) 2s, 1p, 1g	$33
IDE VLB (2HD & 2FD) 2s, 1p, 1g (16,550 UART)	$55
IDE Orchid VLB (2HD & 2FD) 2s, 1p, 1g	$55
IDE DTC 2270 VLB (2HD & 2FD) 2s, 1p, 1g	$58
IDE Promise 420 VLB Caching w/ 512Kb & 2s, 1p	$128
SCSI DTC 3280a SCSI (16-bit)	$98
SCSI DTC 3270 VLB SCSI (32-bit)	$118
SCSI Adaptec 1542CF or 1542CK (16-bit)	$188/ $240
SCSI UltraStor VLB 34F Bus Master (32-bit)	$258
SCSI Adaptec VLB 2842 Master (32-bit)	$308
SCSI Adaptec 2742T EISA Bus Master (32-bit)	$338
SCSI DTC 3290 EISA Bus Master (0Mb ---> 4Mb)	$388
SCSI Bus Logic VLB BT445S (32-bit)	$268

MONITORS

15"

14" (1024x768) .39 Interlaced	$185
14" (1024x768) .28 Interlaced	$228
14" (1024x768) .28 Non-Interlaced	$248
14" Acer (1024x768) .28 Non-Interlaced (34T)	$285
14" ViewSonic 6E (1024x768) .28 NI (60Hz)	$285
14" Sampo KDM-1466 (1024x768) .28 NI (70Hz)	$318
14" ADI 3G (1280x1024) .28 NI	$338
14" NEC 1431 (1024x768) .28 NI Low Radiation	$338
15" Mitac (1280x1024) .28 NI	$358
15" ADI 4G (1280x1024) .28 NI	$408
15" ADI 4G (1024x768) .28 NI (Low Radiation)	$438
15" SAMPO KDM-1566 (1280x1024) .28 NI	$418
15" MAG 15F (1280x1024) .28 NI (Low Radiation)	$478
15" ViewSonic 15" (1280x1024) .28 NI	$458
15" NEC 3FGE (1024x768) .28 NI (60Hz)	$573
15" NEC 4FGE (1024x768) .28 NI (72Hz)	$673
17" SAMPO KDM-1766 (1280x1024) .31 NI	$698
17" ADI Low Radiation (1280x1024) .26 NI	$868
17" ViewSonic 7 (1280x1024) .28 NI	$858
17" Nanao F550i (1280x1024) .28 NI	$958

SVGA CARD

Super VGA Card w/ 512Kb	$34
Windows Accelerator w/ 1Mb (Cirrus Logic)	$54
TsengLab ET-4000 Hi-Color w/ 1Mb	$68
Windows Accelerator VLB w/ 1Mb (Cirrus Logic)	$78
Windows Accelerator + IDE VLB w/ 1Mb	$95
Windows Accelerator VLB w/ 1Mb (ET-4000)	$95
Genoa 8500 Windows Accelerator VLB w/ 1Mb	$88
Spider Windows Accelerator VLB w/ 1Mb	$95
Spider+ Windows Accelerator VLB w/ 1Mb	$115
Spider Black Widow VLB w/ 1Mb	$185
Spider Black Widow VLB w/ 2Mb	$238
Orchid Fahrenheit 1280 Vram w/ 1Mb	$118
Orchid Fahrenheit 1280 Plus w/ 1Mb	$138
Orchid Fahrenheit 1280 VLB w/ 1Mb	$138
Orchid Celsius VLB w/ 1Mb	$195
Orchid Celsius VLB w/ 2Mb	$248
Orchid P9000 VLB w/ 3Mb	$338
Diamond Speed Star Pro VLB w/ 1Mb	$108
Diamond Stealth 24 VLB w/ 1Mb	$145
Diamond Stealth Pro VRAM w/ 2Mb	$318
Diamond Viper VLB w/ 2Mb	$358
ATI Graphic Ultra Pro VLB w/ 2Mb	$325
Other	$Call

HARD DISK & FLoppy Drive & CD ROM

Western Digital

213MB IDE 14ms (Caviar WD1210)	$198
255MB IDE 13ms (Caviar WD2250)	$208
340MB IDE 12ms (Caviar WD2340)	$258
420MB IDE 12ms (Caviar WD2420)	$348
540MB IDE 12ms (Caviar WD2540)	$Coming Soon

Maxtor

130MB IDE 15ms (Maxtor 7120A)	$168
213MB IDE 15ms (Maxtor 7213A)	$198
245MB IDE 15ms (Maxtor 7245A)	$218
340MB IDE 14ms (Maxtor 7345A)	$263
540Mb IDE 8.5ms (Maxtor MXT-540A)	$668
340Mb SCSI 14ms (Maxtor 7345s)	$335
540MB SCSI 8.5ms (Maxtor MXT-540s)	$668
1.2Gb SCSI 8.5ms (Maxtor MXT-1240s)	$1198
1.7Gb SCSI 13ms (Maxtor P1-17s)	$1108

Quantum

170MB IDE 17ms	$178
245MB IDE 16ms (LPS240A)	$238
525MB SCSI-II <10ms 256Kb Cache (LPS525)	$558
1.2Gb SCSI-II < 10ms 512Kb Cache (PD1225S)	$888

Fujitsu

520MB 12ms IDE (M2624T) 3.5"	$558
520MB 12ms SCSI-II (M2624FA) 3.5"	$558
1.2GB 10ms SCSI-II (M2694SA) 3.5"	$868
2.4GB 12ms SCSI-II (M2654SA) 5.25" FH	$1548

Conner

170MB IDE 17ms (CP30174E)	$168
250MB IDE 14ms (CP30254)	$208

Floppy Drives

1.2Mb Floppy Drive (Teac)	$45
1.44Mb Floppy Drive (Teac) w/ bracket	$45
2.88Mb Floppy Drive (Toshiba)	$65
1.2MB & 1.44Mb Combo (Teac)	$108

CD-ROM Drives

Mitsumi w/ Controller (350ms)	148
Panasonic CR522 w/ Audio Card & Cables (380ms)	$188
Panasonic CR562 w/ Audio Card & Cables (320ms)	$238
Panasonic CR532 SCSI (290ms)	$318
Texel DM-3028 SCSI (245ms) Internal	$358
Texel DM-3028 SCSI (245ms) External	$458
Toshiba XM-3401B SCSI (200ms)	$365
Chinon CD-535 SCSI (280ms)	$365
NEC CDR-84-1 SCSI (265ms)	$385
Other	$Call

KEYBOARDS

Keyboard 101 Enhanced	$15
Keyboard 101 Keytronic	$28
Keyboard 101 Enhanced Click (NTC)	$25
Keyboard 101 Enhanced Click (NMB)	$45
Keyboard Focus 9000 CLick w/ Calculator	$65
Keyboard 101 w/ TrackBall (Qtronic)	$65
Keyboard Ultra (NorthGate)	$95

MODEMS

Modem 2400 & Fax 9600	$45
GVC Modem 14.400 & Fax 14,400 (Internal)	$135
Intel Modem 14.400 & Fax 14,400 (Internal)	$168
US Robotics Sporter 14,400 (Modem & Fax) Int.	$168
US Robotics Sporter 14,400 (Modem & Fax) Ext.	$188

MICE

3 Buttons Mouse Serial $8.95

Logitech 2 Buttons Mouse	$16.98
Logictech Mouse Man Serial (Retail Box)	$39.95
Logictech Mouse Man Bus	$55
Logictech Portable Serial Mouse	$45
Real Microsoft Serial Mouse (New Model)	$40
Real Microsoft Bus Mouse	$65

ACCESSORIES

CD Caddy	$3.75
Cpu cooling kit w/ heatsink & fan	$9.95
MS-DOS 6.0 (w/ System)	$38
Windows 3.1 (w/ System)	$38
Math Coprocessor 387-40MHz	$45
Math Coprocessor 387SX-33MHz	$35
Panasonic 2123 Printer	$238
Color Option Kit	$48

Case

Mini Tower Case + Power Supply 230W	$45
Mini DeskTop Case + Power Supply 200W	$50
Medium Tower Case + Power Supply 230W	$75
Full Size Tower Case + Power Supply 250W	$98
Black Tower (All Model)	$Call

Tape Backup

Colorado 120Mb Tape Back-up	$138
Colorado 250Mb Tape Back-up	$168

Sound Card

Sound Blaster Deluxe	$78
Sound Blaster Pro Deluxe	$118
Sound Blaster 16 Basic	$138
Sound Blaster 16 ASP	$188
Media Vision Spectrum Pro 16	$158
Media Vision Pro Audio Studio	$198

Special of the month !!!

MB Opti VLB 486DX Series w/ 128Kb w/o CPU	$88
MB Hint EISA VLB 486DX Series w/ 256Kb w/o CPU	$148
MB Orchid VLB 486DX Series w/ 256Kb w/o CPU	$148
MB IBM VLB 486SLC2-66Mhz w/ 64Kb w/ CPU	$268
Toshiba XM-3401B SCSI (200ms) Internal	$348

RESOURCES

Calendar Of Events

CONFERENCES, SHOWS, AND OTHER SPECIAL EVENTS

NOVEMBER

November 13 Computer Show & Sale. Santa Clara County Fairgrounds. Richard James. Call: 1-800-685-1400.

November 13 The Computer Show And Sale. San Mateo Expo Center. MarketPro. Call: (415)388-8893.

November 14 Computer Show & Sale. Rancho Arroyo Sports Complex, Sacramento. Richard James. Call: 1-800-685-1400.

November 14 The Computer Show And Sale. Sonoma County Fairgrounds. MarketPro. Call: (415)388-8893.

November 16 Free Lecture On The Evolution Of C++ By Jim Waldo. San Jose. Computer Literacy Bookshop. Call: (408)435-1118.

November 17 Forum On Entrepreneuring Opportunities Online. Palo Alto. Software Entrepreneurs' Forum. Call: (415)364-1571.

November 20 Computer Show & Sale. San Francisco Cow Palace. Richard James. Call: 1-800-685-1400.

November 21 Computer Show & Sale. Alameda County Fairgrounds. Richard James. Call: 1-800-685-1400.

November 21 The Computer Show And Sale. Centre Concord. MarketPro. Call: (415)388-8893.

November 27 The Computer Show And Sale. Solano County Fairgrounds, Vallejo. MarketPro. Call: (415)388-8893.

November 28 The Computer Show And Sale. Scottish Rite Center, Sacramento. MarketPro. Call: (415)388-8893.

DECEMBER

December 4 Computer Show & Sale. Santa Clara County Fairgrounds. Richard James. Call: 1-800-685-1400.

December 5 Computer, Ham Radio, Electronics Swap Meet. Livermore. Livermore Amateur Radio Club. Call: (510)447-3857 or (510)783-8052.

December 5 Computer Show & Sale. Rancho Arroyo Sports Complex. Richard James. Call: 1-800-685-1400.

December 5 The Computer Show And Sale. Centre Concord. MarketPro. Call: (415)388-8893.

December 6–7 The Personal Computer Outlook Conference. San Francisco. Technologic Partners. Call: (212)696-9330.

December 6–9 Sun User Group Conference And Exhibition. San Jose. PCI Tradeshow Management. Call: 1-800-727-EXPO.

December 7–8 Newton Platform Development Conference. Santa Clara. Apple Computer, Inc. Call: 1-800-301-9009.

December 7–10 SUG-West Conference. San Jose. Sun User Group. Call: PCI Trade Show Management, 1-800-727-EXPO. Email: sugshow@pcinews.lonestar.org.

December 11 Computer Show & Sale. Oakland Coliseum. Richard James. Call: 1-800-685-1400.

December 12 Computer Show & Sale. Alameda County Fair-

Continued

NOVEMBER 9–10

1993 FRENCH-AMERICAN TECHNOLOGY MEETINGS

Redwood City

Advances made by French computer companies in voice recognition, pen computing, and artificial intelligence are among the topics of this event. The third annual meetings provide a forum for French and American companies to discuss ways to utilize new developments in computer hardware and software by combining resources, trading ideas, and forming alliances. They bring together over forty French companies, including Chorus Systems and Univers Informatitique, and one hundred American firms, including Hewlett-Packard and Sun Microsystems. The event is sponsored by Business France. Call: (415)541-0315.

NOVEMBER 17

FORUM ON ONLINE ENTREPRENEURING OPPORTUNITIES

Palo Alto

The Software Entrepreneurs' Forum hosts a speaker panel on the subject of entrepreneuring opportunities online. Among the panelists exchanging ideas will be Ellen Pack, founder of the Women's Information Resource & Exchange; Brewster Kahle, president of Wide Area Information Servers; and Dick Luebke, vice president of Ensemble Information Systems. The $35 nonmember fee includes dinner and one cocktail. The speakers begin at 7:00 pm. Call: (415)854-7219.

DECEMBER 5

CALIFORNIA COMPUTER SHOW AND SALE

Sacramento

This computer show features a variety of exhibitors and showcases computer products worth millions of dollars. The products include PC compatible hardware, software, CD-ROM, peripherals, and accessories. Hosted by Richard James, the show takes place at the Rancho Arroyo Sports Complex. Hours are 10:00 am to 4:00 pm. Call: 1-800-685-1400.

DECEMBER 7–8

FIRST INTERNATIONAL NEWTON PLATFORM DEVELOPMENT CONFERENCE

Santa Clara

This event gives developers an opportunity to explore the possibility of developing applications based on Newton technology. Participants can choose from three specialized conference tracks: an orientation for beginning Newton developers, advanced offerings for experienced Newton developers, and an overview of the market and business opportunities presented by Newton technology. Hosted by Apple Computer, Inc., the event is a chance to meet partners and learn about product plans and communications services. It takes place at the Santa Clara Convention Center. Call: 1-800-800-6812.

Calendar Of Events continued

grounds. Richard James. Call: 1-800-685-1400.

December 12 The Computer Show And Sale. Sonoma County Fairgrounds, Santa Rosa. MarketPro. Call: (415)388-8893.

December 18 Computer Show & Sale. Cow Palace. Richard James. Call: 1-800-685-1400.

December 18 The Computer Show And Sale. Solano County Fairgrounds, Vallejo. MarketPro. Call: (415)388-8893.

December 19 The Computer Show And Sale. Marin Civic Center, San Rafael. MarketPro. Call: (415)388-8893.

JANUARY

January 2 Computer, Ham Radio, Electronics Swap Meet. Livermore. Livermore Amateur Radio Club. Call: (510)447-3857 or (510)783-8052.

January 2 The Computer Show And Sale. Cal Expo, Sacramento. MarketPro. Call: (415)388-8893.

January 5–8 MacWORLD Expo. San Francisco. Smith & Shows. Call: (617)361-8000.

January 8 The Computer Show And Sale. Sonoma County Fairgrounds, Santa Rosa. MarketPro. Call: (415)388-8893.

January 9 The Computer Show And Sale. Conference Center, South San Francisco. MarketPro. Call: (415)388-8893.

January 16 The Computer Show And Sale. Solano County Fairgrounds, Vallejo. MarketPro. Call: (415)388-8893.

January 17–18 Worldwide Electronic Commerce: Law, Policy, And Controls Conference. New York. MultiCorp. Call: (214)516-4900.

January 18–21 Client/Server Conference And Exposition. San Jose. CMP Conference & Exhibit Group. Call: 1-800-972-5244.

January 23 The Computer Show And Sale. Scottish Rite Center, Sacramento. MarketPro. Call: (415)388-8893.

January 24–26 Photoshop Conference. San Francisco. Thunder Lizard Productions. Call: Marci Eversole, 1-800-221-3806.

January 25 Federal On-Site Technology Exhibit. Sacramento. US Army Corp of Engineers. Call: 1-800-878-2940.

January 25–26 Analysis And Design For Client/Server Applications Seminar. Santa Clara. DCI. Call: (508)470-3880.

January 30 The Computer Show And Sale. Conference Center, South San Francisco. MarketPro. Call: (415)388-8893.

FEBRUARY

February 6 Computer, Ham Radio, Electronics Swap Meet. Livermore. Livermore Amateur Radio Club. Call: (510)447-3857 or (510)783-8052.

February 8–10 Workstation Expo. San Jose. PCI Trade Show Management. Call: 1-800-727-EXPO.

CLASSES, SEMINARS, AND WORKSHOPS

NOVEMBER

November 13 Doing Business In The Emerging Multimedia Industry Class. Santa Clara. UC Extension in Santa Clara. Call: (408)459-8639.

November 13 Excel On PC/Mac Class. San Jose. InfoMind. Call: (408)243-1121.

November 13 Lotus On DOS For Windows Class. San Jose. InfoMind. Call: (408)243-1121.

November 13 Lotus 1-2-3 Class. Oakland. Action Computer Training Institute. Call: 1-800-9PC-SKIL.

November 13 T1.5 Seminar. San Francisco. SF State Extension. Call: (415)904-7710.

November 15 Advanced MS-DOS 5.0/6.0 Class. Emeryville. Northwest Computer Systems. Call: (510)653-0808.

November 15 Beginning Lotus 1-2-3 For Windows 4.0 Class. Oakland. California Computer Options. Call: (510)444-5700.

November 15 Beginning Paradox For DOS/Windows Class. Emeryville. Northwest Computer Systems. Call: (510)653-0808.

November 15 Beginning Word For Windows Class. Emeryville. Informational Data Networks. Call: 1-800-696-5267.

November 15 Excel Class. Oakland. Action Computer Training Institute. Call: 1-800-9PC-SKIL.

November 15 Excel 4.0 Advance Macros Class. Emeryville. Northwest Computer Systems. Call: (510)653-0808.

November 15 Excel Macros Class. San Francisco. Ciber Training Center. Call: (415)974-7206.

November 15 Free AutoCAD Revisited Presentation. San Francisco. SF State Extension. Call: (415)904-7710.

November 15 High-Impact Business Writing Seminar. Oakland. National Seminars Group. Call: 1-800-258-7246.

November 15 Intermediate WordPerfect Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

November 15 Intro To Microsoft Word On PC/Mac Class. San Jose. InfoMind. Call: (408)243-1121.

November 15 TCP/IP (CNE) Class. Oakland. MIS Services Corp. Call: (510)208-5700.

November 15–16 Local Area Networks: LANtastic To Novell Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

November 15–16 Microsoft Access, Level II Class. San Francisco. Ciber Training Center. Call: (415)974-7206.

November 15 & 18 Macromedia Director Class. San Francisco. Ciber Training Center. Call: (415)974-7206.

November 15–December 8 Intro To AutoCAD For Windows Class. San Francisco. SF State Extension. Call: (415)904-7710.

November 16 Beginning Excel For Windows Class. Emeryville. Informational Data Networks. Call: 1-800-696-5267.

November 16 Free Desktop Marketing Seminar. Menlo Park. Marketplace. Call: 1-800-999-9497.

November 16 High-Impact Business Writing Seminar. Concord. National Seminars Group. Call: 1-800-258-7246.

November 16 Intermediate Paradox Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

November 16 Intro To QuattroPro For Windows Class. San Jose. InfoMind. Call: (408)243-1121.

November 16 Macintosh Basics II Class. San Mateo. Community Career Education Center. Call: (415)345-0753.

November 16 PageMaker Class. Oakland. Action Computer Training Institute. Call: 1-800-9PC-SKIL.

November 16 PageMaker II Class. San Francisco. Media Alliance. Call: (415)771-7133.

November 16 TCP/IP (CNE) Class. Oakland. MIS Services Corp. Call: (510)208-5700.

November 16 Word 5.1/6.0 For DOS, Level 1 Class. Emeryville. Northwest Computer Systems. Call: (510)653-0808.

November 16 & 18 Beginning Excel Class. San Francisco. Ciber Training Center. Call: (415)974-7206.

November 16–19 2-D MicroStation Class. San Francisco. SF State Extension. Call: (415)904-7710.

November 16 & 23 Modern Telecommunications In The "Information Age" Class. San Francisco. SF State Extension. Call: (415)904-7710.

November 17 Advanced Illustrator Class. San Francisco. Ciber Training Center. Call: (415)974-7206.

November 17 Beginning WordPerfect 6.0 Class. Pleasant Hill. ACTech. Call: (510)685-6327.

November 17 Free Desktop Marketing Seminar. San Francisco. Marketplace. Call: 1-800-999-9497.

November 17 High-Impact Business Writing Seminar. San Jose. National Seminars Group. Call: 1-800-258-7246.

November 17 Intermediate FoxPro For DOS/Windows Class. Emeryville. Northwest Computer Systems. Call: (510)653-0808.

Continued

Calendar Of Events continued

November 17 Intermediate Lotus 1-2-3 Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

November 17 Intro To WordPerfect 5.1, 5.2, 6.0 Class. San Jose. InfoMind. Call: (408)243-1121.

November 17 NFS (CNE) Class. Oakland. MIS Services Corp. Call: (510)208-5700.

November 17 Programming Windows In Visual C++ And Microsoft Foundation Class. Berkeley. UC Berkeley Extension. Call: (510)642-3112.

November 17 Quicken Class. San Mateo. Community Career Education Center. Call: (415)345-0753.

November 17–18 Quark Project Class. San Francisco. Ciber Training Center. Call: (415)974-7206.

November 17–18 Symbols, Lies, And Metaphors Lecture. San Francisco. SF State Extension. Call: (415)904-7700.

November 17–19 Novell Advanced Administration Class. Oakland. California Computer Options. Call: (510)444-5700.

November 18 Access Class. Oakland. Action Computer Training Institute. Call: 1-800-9PC-SKIL.

November 18 Adobe Illustrator II Class. San Francisco. Media Alliance. Call: (415)771-7133.

November 18 Build And Upgrade An IBM PC Clone Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

November 18 Computer Clip Art Production Seminar. San Francisco. OCVS. Call: (415)344-3998.

November 18 CorelDRAW! 4.0 User Group Meeting. Santa Clara. Goals of California. Call: 1-800-462-5763, ext. 6625.

November 18 Free Desktop Marketing Seminar. Burlingame. Marketplace. Call: 1-800-999-9497.

November 18 High-Impact Business Writing Seminar. San Francisco. National Seminars Group. Call: 1-800-258-7246.

November 18 Intermediate Excel For Windows Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

November 18 Intermediate FoxPro For DOS/Windows Class. Emeryville. Northwest Computer Systems. Call: (510)653-0808.

November 18 Intermediate Word For Windows Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

November 18 NFS (CNE) Class. Oakland. MIS Services Corp. Call: (510)208-5700.

November 18 Word 2.0 For Windows, Level 2 Class. Emeryville. Northwest Computer Systems. Call: (510)653-0808.

November 19 Access 1.0, Level 1 Class. Emeryville. Northwest Computer Systems. Call: (510)653-0808.

November 19 Advanced PageMaker Class. San Francisco. Ciber Training Center. Call: (415)974-7206.

November 19 Advanced WordPerfect Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

November 19 Free Desktop Marketing Seminar. Sacramento. Marketplace. Call: 1-800-999-9497.

November 19 High-Impact Business Writing Seminar. Santa Rosa. National Seminars Group. Call: 1-800-258-7246.

November 19 Intermediate Excel For Windows Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

November 19 Intermediate Paradox For DOS/Windows Class. Emeryville. Northwest Computer Systems. Call: (510)653-0808.

November 19 Microsoft Excel For Windows, Level II Class. San Francisco. Ciber Training Center. Call: (415)974-7206.

November 19 QuattroPro Beginning Class. Emeryville. Northwest Computer Systems. Call: (510)653-0808.

November 19 Towards The Intelligent Office Class. San Francisco. Network Services Group. Call: 1-800-998-3540.

November 19 Windows Class. Oakland. Action Computer Training Institute. Call: 1-800-9PC-SKIL.

November 19 Windows 3.1 Advanced Seminar. Emeryville. Informational Data Networks. Call: 1-800-696-5267.

November 20 Build And Upgrade An IBM PC Clone Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

November 20 Mac Basics Level I Class. San Francisco. Media Alliance. Call: (415)771-7133.

November 20 Managing Telecommunications Networks Class. San Francisco. SF State Extension. Call: (415)904-7710.

November 20 Word/Windows 1 Class. Oakland. Action Computer Training Institute. Call: 1-800-9PC-SKIL.

November 21 A Beginners Guide To Telecommunications On The Mac Class. San Francisco. Media Alliance. Call: (415)771-7133.

November 21 Excel On PC/Mac Class. San Jose. InfoMind. Call: (408)243-1121.

November 21 FrameMaker Course. San Jose. InfoMind. Call: (408)243-1121.

November 21 PageMaker On PC/Mac Course. San Jose. InfoMind. Call: (408)243-1121.

November 22 Automating Your Accounting And (Contact) Management Software Seminar. Emeryville. Informational Data Networks. Call: 1-800-696-5267.

November 22 IBM PC Basics Class. San Mateo. Community Career Education Center. Call: (415)345-0753.

November 22 Intermediate AmiPro Course. San Jose. InfoMind. Call: (408)243-1121.

November 22 Netware 3.11 System Manager (CNA) Class. Oakland. MIS Services Corp. Call: (510)208-5700.

November 22 WordPerfect For DOS, Level I Class. San Francisco. Ciber Training Center. Call: (415)974-7206.

November 22 WordPerfect For Windows Macros Class. Oakland. California Computer Options. Call: (510)444-5700.

November 22–23 3-D MicroStation Class. San Francisco. SF State Extension. Call: (415)904-7710.

November 23 Advanced FileMaker Pro Class. San Francisco. Ciber Training Center. Call: (415)974-7206.

November 23 Harvard Graphics For Windows Level I Class. San Francisco. Ciber Training Center. Call: (415)974-7206.

November 23 Intermediate Excel For Windows Class. Emeryville. Informational Data Networks. Call: 1-800-696-5267.

November 23 Intermediate WordPerfect For Windows (5.2) Class. Oakland. California Computer Options. Call: (510)444-5700.

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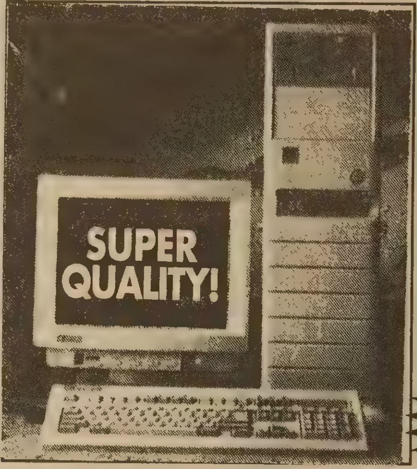

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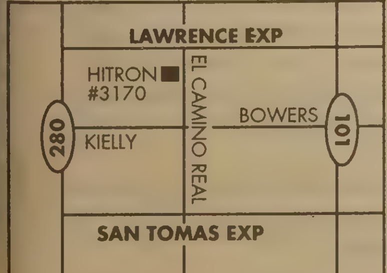

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November 23 Quicken/Windows Class. Oakland. Action Computer Training Institute. Call: 1-800-9PC-SKIL.

November 23 WordPerfect For Windows 5.2, Level 2 Class. Emeryville. Northwest Computer Systems. Call: (510)653-0808.

November 23–24 Local Area Networks: LANtastic To Novell Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

November 23–24 PC Troubleshooting & Repair Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

November 23–30 Director 1 Class. San Francisco. Center for Electronic Art. Call: (415)956-6500.

November 23–December 21 3D Studio Class. San Francisco. Center for Electronic Art. Call: (415)956-6500.

November 24 Intermediate WordPerfect 5.1, 5.2, 6.0 Course. San Jose. InfoMind. Call: (408)243-1121.

November 24 Lotus 1-2-3 Class. Oakland. Action Computer Training Institute. Call: 1-800-9PC-SKIL.

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November 29–December 6 Intro To The PC For CAD Class. San Francisco. SF State Extension. Call: (415)904-7710.

November 29 & December 6 & 13 Photoshop Intensive Workshop. San Francisco. Media Alliance. Call: (415)771-7133.

November 29–December 20 Symbolics Animation Class. San Francisco. Center for Electronic Art. Call: (415)956-6500.

November 30 Advanced Excel Class. San Francisco. Ciber Training Center. Call: (415)974-7206.

November 30 Advanced FoxPro For DOS/Windows Class. Emeryville. Northwest Computer Systems. Call: (510)653-0808.

November 30 Beginning Lotus For DOS Course. San Jose. InfoMind. Call: (408)243-1121.

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November 30 Windows For Workgroups Class. Pleasant Hill. ACTech. Call: (510)685-6327.

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December 2 Beginning Lotus 1-2-3 Class. Pleasant Hill. ACTech. Call: (510)685-6327.

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December 2 Beginning QuarkXPress Class. San Francisco. Ciber Training Center. Call: (415)974-7206.

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December 2–3 Asymetrix Toolbook For Windows Class. San Francisco. SF State Extension. Call: (415)904-7700.

December 2–5 Interactive Filmmaking Part II: Structures And Techniques Lecture. San Francisco. SF State Extension. Call: (415)904-7700.

December 2 & 7 & 9 Psychology Of Buying Class. Santa Clara. UC Extension in Santa Clara. Call: (408)459-8639.

December 2–16 Aldus PageMaker Class. San Francisco. Center for Electronic Art. Call: (415)956-6500.

December 3 All Day Individually Customized Software Course. San Jose. InfoMind. Call: (408)243-1121.

December 3 Beginning Paradox For Windows Class. Emeryville. Informational Data Networks. Call: 1-800-696-5267.

December 3 Intro To Computers Class. Oakland. Action Computer Network Institute. Call: 1-800-9PC-SKIL.

December 3 & 10 Microsoft Word Class. San Mateo. Community Career Education Center. Call: (415)345-0753.

December 3 & 6 Beginning Photoshop Class. San Francisco. Ciber Training Center. Call: (415)974-7206.

December 4 CNE Certification Study Support Group. Oakland. Excel Micro Solutions. Call: (510)836-2040.

December 4 Introduction To Pre-Press On The Mac Class. San Francisco. Media Alliance. Call: (415)771-7133.

December 4 Mac Basics Level I Class. San Francisco. Media Alliance. Call: (415)771-7133.

December 4 Macintosh Basics Class. San Mateo. Community Career Education Center. Call: (415)345-0753.

December 4–13 Autodesk 3D Studio Basics Class. San Francisco. SF State Extension Call: (415)904-7700.

December 5 Beginning PageMaker For Windows Class. Emeryville. Informational Data Networks. Call: 1-800-696-5267.

December 5 Persuasion On PC/Mac Course. San Jose. InfoMind. Call: (408)243-1121.

December 6 Adobe Illustrator II Class. San Francisco. Media Alliance. Call: (415)771-7133.

December 6 Excel 1 Class. Oakland. Action Computer Network Institute. Call: 1-800-9PC-SKIL.

December 6 FileMaker Pro For Windows, Level I Class. San Francisco. Ciber Training Center. Call: (415)974-7206.

December 6 Intermediate AmiPro Class. San Jose. InfoMind. Call: (408)243-1121.

December 7 Beginning Paradox For DOS/Windows Class. Emeryville. Northwest Computer Systems. Call: (510)653-0808.

December 7 Beginning Windows Class. Oakland. California Computer Options. Call: (510)444-5700.

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December 7 Software Licensing Agreements Seminar. San Jose. Center for Advanced Professional Development Seminars. Call: (714)261-6277.

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December 7–10 Intro To AutoCAD For DOS Class. San Francisco. SF State Extension. Call: (415)904-7710.

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December 8 Advanced Microsoft Windows 3.1 Class. San Jose. InfoMind. Call: (408)243-1121.

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December 8 Excel Macros Class. San Francisco. Ciber Training Center. Call: (415)974-7206.

December 8 Intermediate WordPerfect 5.1, 5.2, 6.0 Class. San Jose. InfoMind. Call: (408)243-1121.

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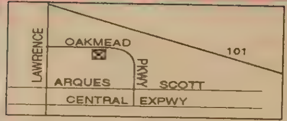

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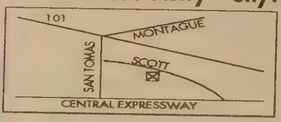

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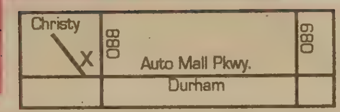

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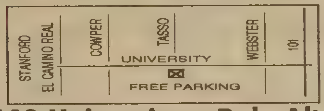

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BAY AREA BBSes

By Kathleen Creighton

Gamers, Mechanics, And Feds

David Janakes wrote an interactive, text-based fantasy game. When Janakes wanted people to play his game, he could have put it on disk and distributed it and that would have been the end of it, but instead he got the bright idea of putting the game online. On his own BBS.

Janakes' game has blossomed into a 24-line gaming, chat, and message area BBS in Monterey called Monterey Gaming System (MGS), running Janakes' homebrewed and easy-to-use software, drawing on a regular user base from as far north as San Jose. Throw in a variety of magazines online, a classifieds ads section, two adult sysops (Janakes and his wife Lisa), and lack of hype, and MGS would likely be embraced by any community.

Chat is MGS's most popular feature, but unlike most "chat boards," MGS's message areas also generate traffic. A couple of message areas are specific to MGS, such as a suggestions topic and a topic to plan user get-togethers (the October MGS get-together was held in a bowling alley in Monterey), while other topics range from cooking to debate.

I have a notorious lack of interest in role-playing games, so I can't fairly review Janakes' centerpiece, Timeslip. However, there are a number of other games to play, including a trivia game and several word games, which not only rely on the ability to come up with an answer but also to spell it correctly, which increases the challenge level. There are also nine "game rooms" where users can run their own games, such as Dungeons and Dragons, or word or trivia games.

MGS is not a full subscription system, and does not penalize anybody for not subscribing. Many services are free, and users who want more can subscribe and have access to everything else MGS offers. Time and access can be purchased in blocks of credits, which can be a little confusing, but even here the Janakeses have taken an innovative approach by allowing subscribers to purchase credits via a 900 number (as well as by mail or in person).

Starting in November, MGS subscribers (level C or higher) will be eligible for a monthly drawing to win a high-speed modem. Right now users can "pull" the handle on a virtual slot machine once a day to take a chance at winning a "jackpot" of online time credits.

Monterey Gaming System is so well done and has such broad appeal that it could easily be almost anyone's "home" system, and one worth watching to see what the Janakeses come up with next. (408/655-5555, 2400 baud, 8-N-1, David and Lisa Janakes, sysops.)

UP THE COAST

It was a stretch to include Monterey in the Bay Area, but in other columns I've gone north to Sacramento and south to Gilroy. While I was traveling on the virtual Pacific Coast, I headed back up north to Electric Magazine BBS in Fort Bragg, on the Mendocino Coast. This is one of the oldest BBSes in the state, founded in 1983. (707/961-0735, 2400 baud, 8-N-1, Bob Shannon, sysop.)

EMBBS has a large, eclectic message base of RIME echoes—just the thing to read on those cold, foggy

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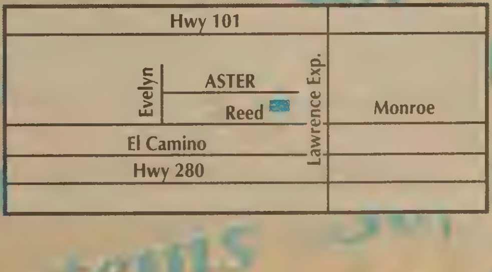

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- Labtec 550 Amplified Speakers
- Dynamic Microphone
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Amr. Bus. Phone Book '93	19	Dinasaur Adventure	29	MPC Wizard	10
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Bible Library	29	Fonts for the Professional	29	Space Adventure	35
Bibles & Religion	13	Garbo Ms Dos/Mac	15	Space Quest 4	19
Book Shelf 1993	49	Gifs Galaxy	29	Stellar 7	19
C User's Group Library	25	Gifs Galore	15	Technotools	13
Career Opportunities	29	Grolier's 92'	49	Toolworks Ref. Library	21
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NEC	NEW CDR-84-3Xi	SCSI II	195	450	256	TRI	YES	YES	$469
PAN	CR-522	AT-BUS	380	150	64	SNG	YES	NO	$169
PAN	CR-562	AT-BUS	320	300	64	DBL	YES	YES	$209
PAN	CR-532	\SCSI	290	300	128	DBL	YES	YES	$309
PIONEER	DRM-604X	SCSI II	300	612	128	QUAD	YES	YES	$1,175
SONY	CDU-31A	SONY BUS	490	150	64	SNG	YES	YES	$149
SONY	CDU-561	SCSI II	285	300	256	DBL	YES	YES	$349
TEAC	CD-50	SCSI II	265	335	64	DBL	YES	YES	$309
TEXEL	DM 3028	SCSI II	240	335	64	DBL	YES	YES	$349
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Future Domain TMC850 8bit SCSI	$49
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CEI VIdeo Clipper	15	16bit	160x120	3	Ntsc,Pal	$319
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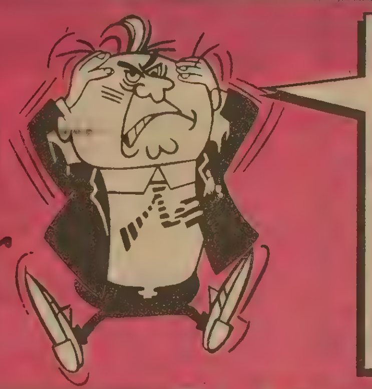

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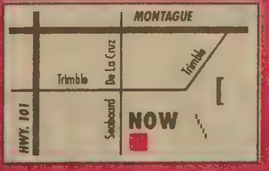

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Bay Window BBS. (415)755-2939. 9 am–11 pm, DOS, demal, windows, games, utilities files, no GIFs or handles allowed. Sysop: Judy. [Exp. #116.]

The Board With No Name North. (415)826-9626. 8-N-1, 24 hrs., 300/1200/2400/9600/14,400. Gay male BBS, chat, OMNIChat, email, library, GIFs, and fantasy text. [Exp. #115.]

Clipboard. (415)239-0454. 12pm–12am. 14,400. Clipper files, FidoNet, Internet, Intelec newsgroups and conferences (job listings, for sale), and doors. Sysop: George Jereza. [Exp. #118.]

Corner UNIX. (415)564-8750, 564-4345. 8-N-1, 1200/2400/9600/14,400. San Francisco Public Access UNIX. Full USENET, Internet email, multiline. Sysop: Furryeel. [Exp. #116.]

Creekside BBS. (415)343-5692. 1200/2400/9600/14,400. Genealogy- and history-based files and messaging. Intelec, Seeknet, Science Factor Net, GTpowerNet. [Exp. #115.]

The Cutting Edge BBS. (415)751-0588. 24 hrs., 16,800. Multiplayer ultimate games, 70,000 files, 12 CD-ROMs, message nets. [Exp. #116.]

The Elfspire Tome BBS. (415)595-2387. 1200/2400/9600. A fantasy roleplaying G.M. resource bulletin board featuring roleplaying, games, fantasy clipart, and more. [Exp. #118.]

Fun University Network. (415)327-4591. 8 lines. Free graphical interface, hosted multi-player simulation games, current events focus. Sysops: Wendie, Mike, Lisa, and Scott. [Exp. #118.]

The House Of Solitude. (415)969-THOS. 24 hrs., 300/1200/2400/9600/14,400. Internet mail, files including OS/2, DOS, Windows, UNIX, and text. Sysop: Macron Factor. [Exp. #116.]

IBBS West. (415)564-9996. 8-N-1, 24 hrs., 300/1200/2400/9600/14,400. IBM PC and compatibles, Internet mail, shareware, adult GIF, CD-ROM. Fee. [Exp. #116.]

InfoDude Communications. (415)855-9500. 24 hrs., 2400/9600/14,400. Email, teleconferencing, forums, file areas. First 30 hours free; $3 a month after that. Sysop: Joseph A. Jenkins. [Exp. #120.]

The Informer BBS. (415)468-6713, 468-6714, 468-6715. 24 hrs., 2400/9600/14,400. TCalNet, Intelec, FamNet, WindNet, Newlife, Operating Systems, tech specs, and more. Sysop: John Custer. [Exp. #115.]

Jesse Net. (415)964-2449. Games, gifts, messages for kids. Answers after four rings. Sysop: Jesse Radin [Exp. #115.]

Key Software Products BBS. (415)364-9847. 5 pm–8 am, 24 hrs. wknds. 1200/2400/9600. Home of the Last Byte Memory Manager. Internet email, fax-mail, Simtel-20. Free. Sysop: Dan Lewis [Exp. #116.]

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New Dork Sublime. (415)864-DORK(3675). Sublime news for new dorks everywhere. San Francisco. NIRVANAnet. [Exp. #116.]

The Pyramid/2. (415)494-7497. 8-N-1, 24 hrs., 1200/2400/9600/14,400. Devoted to OS/2. More than 1200 new files online. [Exp. #118.]

Robotic BBS. (415)648-6427. 8-N-1, 24 hrs. Software and messages for robot building enthusiasts. Sysop: Brad Smallridge. [Exp. #118.]

Salt And Light BBS. (415)368-0790,,,252525. 8-N-1, 24 hrs., 2400. Bible/God questions answered by four ordained ministers. Bible study helps and more. Free. Sysop: Lorin Wilson. [Exp. #118.]

Starnet Connections. (415)949-3133. 8-N-1, 24 hrs., 300/1200/2400/9600. Email, UNIX, USENET, UUCP, compilers, public domain software. Local to most 408 areas. Sysop: Richard Mahn. [Exp. #115.]

The Stealth BBS. (415)344-3524. 8-N-1, 24 hrs., 2400/9600/14,400/16,800/38,400. Specializing in VGA GIFs, Sound Blaster, Star Trek. 400MB. Free. [Exp. #118.]

Tangent. (415)703-0150. Gay/bi social, adult only, local (Castro/SF) orientation, eight lines, free until November. [Exp. #115.]

Tsoft BBS and Public Access Unix. (415)969-7958. 8-N-1, 10 lines. Unix accounts on the Internet. info@tsoft.net. Free. [Exp. #116.]

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/usr/school/BBS. (415)564-8896. 7-E-1, 24 hrs., 1200/2400. How to access the Internet, C & UNIX classes. If garbage, press space. Sysop: Dennis McMamara. [Exp. #118.]

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Wetware Diversions Public UNIX. (415)826-0397. 8-N-1, 24 hrs., 1200/2400. eight lines, full UseNet news. Sysop: Eric Swason (editor@wet.UUCP). [Exp. #116.]

Window World BBS. (415)931-0649. 24 hrs. For people who use Windows-type software; info, shareware, chat. Sysop: Bob Cram. [Exp. #115.]

Wine-Tasters BBS. (415)459-1948. 24 hrs. Gigabyte stroll through US wines. Wine country events and more. [Exp. #115.]

510

8-Bit Apple User Group. (510)294-8052. 24 hrs., 300/1200/2400. Apple II support, email, messages, games, files. Free. Sysop: Noel Anklam. [Exp. #118.]

Activist. (510)532-6248. Lots of conspiracy text files—CIA, KGB, FBI, JFK, RFK, MLK, NSA, ADL, CFR, etc. Sysop: Walter Alter. [Exp. #118.]

Amiga Addicts Anonymous BBS. (510)680-2850. 8-N-1, 24 hrs., 1200/2400/9600/14,400. Amiga files. Free. Sysop: Stanley R. [Exp. #118.]

BayB—The Bay Area Baby Board. (510)528-8164. 8-N-1, 14,400. Parents' support network: games, education, health, reviews. Free. Sysops: Lori and Derek. [Exp. #115.]

Berkeley WWIV Chess BBS. (510)486-0795. 8-N-1, 2400. Chessmaster's corner, Fido International Chess Echo, USENET games, chess. Free. Sysop: Walter Wood. [Exp. #118.]

California High-Flyers BBS. (510)568-9250. 8-N-1, 24 hrs., 300/1200/2400. More Bay Area numbers, nine lines, chat, email, library. Ages 10 and up. Two subscription levels. Sysop: Carl Dominic. [Exp. #116.]

Camphor Fountain BBS. (510)547-5741. 8-N-1. Baha'i Network, creative, professional writing, recovery, home schooling, parenting, world religions. Free. Sysop: Linda Martin. [Exp. #118.]

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Code Three Outfitters BBS. (510)799-2921. 24 hrs., 14,400. Emphasis on amateur radio and law enforcement. WCLawNet, DaytonHamNet. Free. Sysop: Kim Leong. [Exp. #115.]

Creative Dimensions BBS. (510)484-4944. 24 hrs., 1200/2400/9600/14,400. Home of CD-man and more. Free downloads on first call. [Exp. #115.]

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The Eagles Lair. (510)671-2238. The Musician's BBS. Free listings, adds transfers, message base, Foxnet. [Exp. #115.]

El Cerrito PD Public Safety BBS. (510)235-3273. 24 hrs., 14,400. Crime prevention and law enforcement oriented, with access to WCLawNET. [Exp. #118.]

Express BBS. (510)317-9685. 24 hrs., 300/1200/ 2400. Early childhood education forum, DOS and Windows shareware. Free. Sysop: Michael Deyerle. [Exp. #116.]

Friendliest BBS. (510)432-7802. 24 hrs., 300/1200/2400/9600. Software exchange. $5 yearly fee. Sysop: Doyle Goodman. [Exp. #116.]

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BBS Column continued...

nights. (Has anyone besides me noticed how cold it gets in Fort Bragg in the summer?) When I took a look at this BBS, the sysop had just gotten an Internet account via Delphi, so there's lots of discussion about bringing Fort Bragg folks online to the worldwide net.

WRENCHER'S WORKBENCH

Fix your car with the help of Wrencher's Workbench in the East Bay. The echo message areas are varied, but the sysop-mechanic's always in to answer questions in the AUTOMOTIVE echo. Wrencher's is also the home of some very clever ASCII menus. (510/357-0927, 2400 baud, 8-N-1, Walter Boland, sysop.)

FEDWORLD

Have you checked out FedWorld yet? The federal government is coming online via a gateway BBS in Virginia which provides direct access to most of the other available federal BBSes. Many of those BBSes are available directly (such as the SBA BBS), but now they're all here in one stop—which has also recently gone on the Internet as fedworld.gov.

Right now, FedWorld tends to provide access to vast collections of obscure information, but there are consumer-interest boards available, such as all federal job listings, economic statistics from the Department of Commerce (for those who can bear to look), and consumer information from the famous Consumer Information Center in Pueblo, Colorado, which is currently in the process of putting all of its booklets online.

The staff at FedWorld is making itself available to all federal agencies to promote getting public information and resources online. When the Congressional Record comes online (it's being worked on now), it will also be available through FedWorld.

Interestingly, FedWorld is administered by a Department of Commerce agency (National Technical Information Service) which is self-supporting through sales of its documents, so FedWorld is run without taxpayer dollars. It's a busy place during the day and its 60 incoming lines tend to stay busy. Try after 9 p.m. PDT and on weekends. (703/321-8020 data 60 lines, up to 9600 baud, 8-N-1, or telnet fedworld.gov)

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BBSes continued...

GIFt Shop. (510)689-4686. Eight lines, 9+ Gigs. The world's best scans originate here. Sysop: Waik Gan. [Exp. #118.]

Gold Diggers BBS. (510)568-7807,,,23,23. 24 hrs., 2400/9600/14,400/ 19,200. IBM, Atari ST, Amiga, Mac, files and messages. Registration $10 per year. [Exp. #115.]

The Hobby Shop BBS. (510)357-4125. 8-N-1, 2400/38,400. Over 5600 files and growing. FidoNet, many conferences. [Exp. #115.]

Legal Information Systems. (510)644-1899. 24 hrs., 1200/2400. California Appeals, California Supreme Court, and US 9th Circuit recent decisions. Full text search. [Exp. #118.]

The Lost Worlds BBS. (510)888-1714. 8-N-1, 2,000-plus files, messages, and online games. We have it all. Call now! [Exp. #116.]

LZ/Nightline—A Vet-Friendly BBS. (510)273-7830 (14.4K), 273-7831 (2400). Welcome all vets. Vet/VA info, DOS/Win files, nationwide email and Vetlink #22. Free. Sysop: Jon Mankowski. [Exp. #115.]

Morph's Outpost On The Digital Frontier. (510)238-4554. 14,400. First-class BBS. [Exp. #116.]

The New-Ark BBS. (510)796-0947. 24 hrs., 300/1200/ 2400/9600. Tradewars, running on two CD-ROMs. Reg. required. Sysop: Hiram Wolf. [Exp. #116.]

Olde Stuff BBS. (510)530-3051. 8-N-1, 24 hrs., 9600. Antiques and collectibles. Buy, sell, learn. Sysop: Bill Clark. [Exp. #115.]

Otoko Empire BBS. (510)754-6521. 24 hrs., 1200/2400. Specializing in gay topics, travel, international pen pals, male GIFs. Sysop: Hiroshi. [Exp. #118.]

The Phantom Zone BBS. (510)538-9586. 8-N-1, 24 hrs., 300/1200/2400/9600/ 14,400. Online games, offline mail reader. Free. Friendly sysop. [Exp. #115.]

Rapture BBS. (510)689-6955. 8-N-1, up to 14,400. Erotic images, shopping mall, Internet gateway. Adults only. Sysops: Athina and Aphrodite. [Exp. #118.]

Realitycheck. (510)527-1662. 9600. Now in Albany, instant access. NIRVANAnet. [Exp. #116.]

Records Department. (510)426-0470. 14,400. Internet, FidoNet, Amiga, IBM, and Mac files, gaming, chat. [Exp. #116.]

The Revolution BBS. (510)451-1206. Huge free BBS devoted to your Mac. Over 1.2 gigs of Mac files online. USR Dual Standard for high-speed connections. Sysop: Mike McGee. [Exp. #116.]

Sir James BBS W/ Magick Resource Center. (510)261-6567, 2400; 261-6863, 14,400. Nets: Fido, Pods, Dharma, and more. Rooms: pagan, adult, music/midi, and more. $5 first time. Sysop: Sir James. [Exp. #118.]

& The Temple Of The Screaming Electron. (510)935-5845. A safe haven for visionaries and paranoids. 242MB of unusual text. NIRVANAnet HQ. Multiuser chat lines: two free, two contributor, two local. Sysop: Jeff Hunter. [Exp. #116.]

Terminal One BBS. (510)432-2461. 1200/ 2400/9600/14,400. Shareware, GIFs, animations, sound files, Windows utils, messages and games. Sysop: Pete Nelson. [Exp. #116.]

Testing 1,2,3...BBS. (510)373-0873. 24 hrs., 2400/9600/14,400. IBM/Mac files, message base with lots of subjects. Livermore. Sysop: Corey L. Nelson. [Exp. #118.]

Tiger Team Buddhist Info Network. (510)268-0102. 24 hrs., 14,400. Email, DharmaNet, Internet, conferences, local and national event listings, three phone lines. Sysops: Gary Ray & Jeff Macko. [Exp. #115.]

VA Listings. (510)637-1261. 24 hrs., 300/1200/2400/ 9600. VA-owned homes for sale. Sysop: David Piersall. [Exp. #116.]

VARS/Resellers. (510)687-3633. 8-N-1, 1200/2400/ 9600. BMS all-in-one P.O.S. Resellers and distributors paradise. DOS and Windows versions. [Exp. #118.]

Viper 1 Premium BBS. (510)535-02315, 535-0231. 1200/2400/9600/14,400. Multiline, 9000MB of storage, 5.2GB online, large adult file areas, games, image scanning service available. Sysop: Andre Porter. [Exp. #118.]

The Weasel Den II. (510)432-0204. Online games and messages only. WeasNet @1 and CARDNet @2. [Exp. #116.]

Wishing Well BBS. (510)745-7901. 24 hrs., 1200/2400/9600/14,400. 85+ online games, quality files, ANSI Art, conferences, matchmaker, and more! Sysop: MaryLou White. [Exp. #115.]

707

CareerLine BBS. (707)253-2149. 9:00 am to 12 am. 9600. Download Mac software, business opportunities, careers, conferences. Log in as guest, order gourmet coffee. [Exp. #118.]

Dobbs Enferprises. (707)427-0277. 300/1200/ 2400/9600. Over 70,000 files online, four lines, U'NINet, SourceNet, doors. [Exp. #118.]

Mnemonic BBS. (707)451-8353, 451-4678. 14,400. 15,000 plus files, NetMail, doors. Free. [Exp. #118.]

The Programmer's Corner. (707)765-1431. 24 hrs., 14,400. Internet email, over 200 Usenet and Fidonet groups. 2+ Gig source code. Sysop: Randy Just. [Exp. #118.]

Recommended BBS. (707)448-2225. 24 hrs., 300/1200/2400. Multiuser games, teleconference, conversational, and technical areas. All welcome. Sysop: Jay C. Parangalan. [Exp. #116.]

Threat Management Institute BBS. (707)935-1713. 8-N-1, 24 hrs., Conferences dealing with issues of personal defense, firearms, law, etc. Schedule of TMI classes. Free. Sysop: Peter Alan Kasler. [Exp. #118.]

User Friendly BBS. (707)645-8894. 8-N-1, 24 hrs., 1200/2400/9600/ 14,400. Police/job search info. Member WCLawNet. Sysop: Jim K. [Exp. #118.]

The WINd Tunnel. (707)421-0380. 24 hrs., 1200/2400/9600/14,400. Your source for Windows programs, utilities, games, WAVs, and TT Fonts. Sysop: John Wright. [Exp. #115.]

916

24th Street Exchange. (916)448-2483. 8-N-1, 24 hrs., 300/1200/2400/9600/ 14,400. 14 CD-ROMs, FidoNet, USA Today, PC catalog online. Since '83. [Exp. #116.]

ASSOCIATIONS

American Association For Artifical Intelligence Association. Meetings: Individuals interested in learning about the use and application of AI. Call: Richard Skalsky, (415)328-3123, fax: (415)321-4457, email: membership@aaai.org. [Exp. #119.]

The Association For Customer Support Professionals. Dedicated to the deveopment and furtherance of customer support as a distinct profession, to the growth of the support community, and to the improvement of support service. Call: (510)865-4515. Internet: tao@well.sf.ca.us. [Exp. #120.]

Association Of Information Systems Professionals (AISP). Write: 922 Weddell Ct., Sunnyvale, CA 94090. Forums, support, network for IS Professionals. Many SIGs. Call: Al Normantas, (408)745-7600. Fax: (408)745-0740. [Exp. #116.]

Computer Professionals For Social Responsibility. Meetings: Last Sun., 2:00 pm, BMUG Offices, 2066 Center St., Berkeley. Call: Judy Stern, (510)643-7499. [Exp. #117.]

Computer Software Industry Association. CSIA monitors all state legislation which affects the computer software industry and some federal issues. Call: (415)948-9192. [Exp. #115.]

IEEE Computer Society, San Francisco Chapter. Meetings: alternating Weds., 7:30 pm, SF State. Call: (415)905-4400. [Exp. #118.]

Independent Computer Consultants Association, Northern California Chapter. Meetings: 7:30 am–9:15 am, Parc Fifty-Five Hotel, San Francisco. Open discussion, questions and answers. Call: (415)978-9416. [Exp. #120.]

Independent Computer Consultants Association, Silicon Valley Chapter. Meetings: 4th Thrus., 6:00 pm. Hobee's Resturant, 920 Town & Country Village, San Jose. Provides a network for independent computer professionals in South San Francisco Bay and Monterey Bay areas.. Call: Chapter Hotline, (408)492-8888. [Exp. #116.]

National Association Of Professional Organizers (NAPO). Meetings: 2nd Wed., 6:30 pm, Westin San Francisco Airport Hotel in Milbrae. The cost for guests who pre-register is $12; at the door, $15. Call: (415)461-3537. [Exp. #119.]

North Bay Systems Professionals. Meetings: 3rd Wed., 6:00 pm networking, 7:00 pm dinner, 8:00 pm speaker. Embassy Suites Hotel and Conference Center, 101 McInnis Parkway. NBSP provides a forum for systems professionals to grow and to benefit from a network of other like professionals. Call: (415)721-4409. [Exp. #120.]

San Francisco Computer Society. Meetings: 4th Mon., 7:00 pm, Presbyterian Church, 1329 7th Ave., San Francisco. Call: Bob Forsberg, (415)885-6206. [Exp. #120.]

San Francisco Robotics Society Of America. Meetings: 1st Wed., 8:00 pm, Exploratorium, San Francisco. Free. Call: Brad Smallridge, (415)550-0588. [Exp. #120.]

Society For Technical Communication, Berkeley Chapter. Meetings: 2nd Wed., 6:30 pm dinner, 7:45 pm program, Upstairs at Yenching Restaurant, 2017 Shattuck Ave., Berkeley. Different speaker every month. Call: (510)466-5464. [Exp# 119.]

Society For Technical Communication, San Francisco Chapter. Meetings: 3rd Wed., 6:00, program at 7:00 pm. Stagecoach Resturant, 44 Montgomery St., San Francisco. For technical writers, editors, and other technical communicators. Some meetings are dinner meetings, for which reservatins are necessary. Call: (415)985-7121. [Exp. #116.]

Society For Technical Communication, Silicon Valley Chapter. Meetings: 4th Thurs. 5:30 pm cocktails, 6:30 pm dinner, 7:15 dessert. Sunnyvale Hilton, 1250 Lakeside Drive (off Lawrence Expressway at 101). Guest speakers, special interest groups, networking, job listings, newsletter. Call: (408)578-0796. [Exp. #120.]

Software Entrepreneurs' Forum. 3rd Wed., 6:30 pm, Elk's Lodge, 4249 El Camono, Palo Alto. Industry association dedicated to software developers and entrepreneurs, offering information and education on all facets of the software industry. Call: Information, (415)854-7219; reservations, (415)965-9003. [Exp. #120.]

United Sysops Association (U.S.A.). Meetings: 2nd Wed, 7:30 pm, call for location. Call: Beth Hall, (408)522-8690. [Exp. #120].

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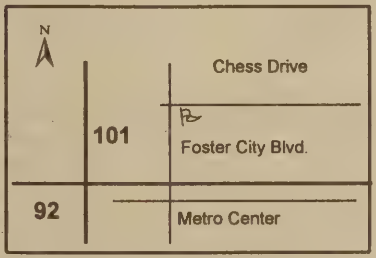

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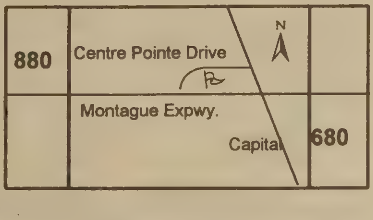

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USER GROUPS

AMIGA

AAA—Amiga Addicts Anonymous. Meetings: 3rd Tues., Concord Water District Bldg., 1311 Concord Ave. Classes, monthly disks, info line. Call: (510)935-0829. [Exp. #115.]

AUM—Amiga Users Of Marin. Meetings: 3rd Wed., 7:30 pm, College of Marin Science Center, Rm. 191, Kentfield. Desktop Video SIG, Rm. 192, 6:00 pm. Call: (415)479-6717. BBS: (415)485-5895. [Exp. #120.]

AWEST Amiga Users In SF. Meetings: 1st Thurs., 7:00 pm, Laguna Honda School, Conference Rm, 1350 7th Ave., San Francisco. Call: (415)584-8406; BBS: (415)824-8774. [Exp. #120.]

FAUG—First Amiga User Group. Meetings: 1st Tues., 7:30 pm, HT Electronics, 275 N. Matilda Ave., Sunnyvale. Q &A, new product demos, public domain software. Call: Mike Fisher, (415)855-9816; BBS: (415)341-7566; Usenet: mikef@vid.hp.com. [Exp. #120.]

Original Amiga User Group. Meetings: 2nd Wednesday Winner Circle Systems, 2618 Telegraph Ave., Berkeley. Call: Bob Krones (510)653-5689 [Exp. #119.]

RE—AMIGA Redwood Empire Amiga User Group. Meetings: 2nd Tues., 7:30 pm, Rohert Park Jr. HS, RM. C-5, 7165 Burton Ave., Rohnert Park. Call: (707)523-9978. BBS: (707)795-2717. [Exp. #120.]

APPLE

PAUG—Peninsula Apple User Group. Meetings: 3rd Thurs., 7:00 pm, Ampex Cafeteria, 411 Broadway, Redwood City. Beginners and advanced, question and answer, new product demos, public domain software. Call: (415)367-8657. [Exp. #118.]

TVAUG—Tri-Valley Apple II User Group. Meetings: 1st Wed., 7:00 pm, Glendale Federal Bank, 3101 Crow Canyon Rd., San Ramon. Software demonstrations, raffle, public domain software, question and answer session. Call: Jerry Carleton, (510)828-0959. [Exp. #118.]

AT&T

AT&T Computer Users Group. Meetings: 1st Wed., 7:00 pm, 50 Fremont St., 40th Floor—near 1st and Mission, San Francisco. Refreshments, technical support, and informal discussions. Also, Sunnyvale DOS and UNIX groups. Call: Jim Lansing, (415)885-6631. [Exp. #119.]

AT&T UNIX Users Group-South Bay. Meetings: 3rd Wed., 7:00 pm, PM new user education. Call: Thad Floryan, (415)961-5157 or USNET: thad.cup.portal.com. [Exp. # 119]

ATARI

ABACUS (Atari Bay Area Users Society). Meetings: 1st Sat. 10:00 am, Christ Church Lutheran, Quintara St. at 20th Ave., San Francisco. Supporting Atari computer users. MIDI and DTP SIGs. Call: Riger Sinasohn, (415)469-7924. [Exp. #116.]

Atari Unlimited. National networking and support. Write: PO Box 691, Mountain View, CA 94042. Call: Patti Barbiero, (415)903-9787. [Exp. #117.]

STace—Atari Computer Enthusiasts. Meetings: 3rd Thurs., 7:30 pm. Pac Tel Bldg., 3260 Sebastopol Rd., Santa Rosa. Call: Kim Remick, (707)795-8173. [Exp. #120.]

CAD

Berkeley Macintosh CAD User Group. Meetings: last Tues., 7:00 pm, San Francisco Apple office, 10th Floor, One Bush Street, San Francisco. Call: Steve Lukrofka, (415)665-1776. [Exp. #120.]

Contra Costa AutoCAD User's Group. Meetings: 2nd Sat., 1:00 pm, 1333 Willow Pass Rd., Suite 203, Concord. All CAD users welcome. Call: (510)687-5666. [Exp. #120.]

Marin AutoCAD Users Group. Meetings: 1st Thurs., 6:30 pm, Eldeon Beck Associates, 171 Carlos Dr., San Rafael. Call: Gini Bollinger, (415)491-4722. [Exp. #120.]

Russian AutoCAD Users Of America. Meetings: 2nd Wed., 6:00 pm, Rosenberg School, 5133 Geary Blvd., San Francisco. Call: Michael Belilovsky, (415)387-7764. [Exp. #120.]

SF AutoCAD User Group. Meetings: 1st Mon. Call: Mark Williamson, (415)383-4060. [Exp. #120.]

Sonoma County AutoCAD Users Group. Meetings: 3rd Tues., Piner High School, Rm. H83, Santa Rosa. Call: Bud Schroeder, (707)987-3108. [Exp. #120.]

COMMODORE

C=HUG (Commodore Hayward User Group). Meetings: 2nd Sat., 2:00 pm, Palma Ceia Park. (510)531-3734. [Exp. #119.]

CWEST Commodore 64/128. Meetings: 1st Sat., 10:00 am, Excelsior Library, 4400 Mission, San Francisco. San Francisco. Call: (415)626-9946. [Exp. #120.]

CONTACT MANAGEMENT

Bay Area TeleMagic User Group. Meetings: 4th Wed., 4:00 pm, Call: George Workman, (408)476-6385. [Exp. #115.]

CP/M

Silicon Valley Access DB Developers Group. Meetings: 2nd Wed., 7:00 pm, Call: Craig Bauer, (408)745-7600. Fax-On-Demand info: (408)745-0740. [Exp. #115.]

DESKTOP PUBLISHING

Ventura Publishing User Group (formerly VPUG). Meetings: 3rd Mon. (Sept.–May), 6:45 pm, 1800 Rollins Rd., Rm. 14, Burlingame. Call: Elinor Cruz, (415)366-5317. [Exp. #117.]

IBM AND COMPATIBLES

Berkeley PC User Group. Meetings: 2nd Tues., 7:00 pm, Winners Circle Systems, 2618 Telegraph Ave., Berkeley. No charge, newsletter $24/yr, free PD library, beginner SIG, GeoEnsemble SIG. Call: Mel Mann, (510)526-4033. [Exp. #117.]

EastBay FOG. Meetings: 2nd Wed., 7:30 pm, Episcopal Church of St. John-in-Montclair, 1707 Gouldin Rd., Montclair. All microcomputers, MS-DOS, CP/M. Call: (510)653-2627. [Exp. #116.]

Fremont PC User Group. Meeting dates vary. Fremont Central Library. Topics: latest in public domain CD-ROMS & how to install a CD-ROM drive. Call: (510)795-4286 ext. 7. BBS: (415)652-1736. [Exp. #120.]

Golden Gate Computer Society. Meetings: 4th Mon, 7:00 pm, San Rafael Community Center, 618 B St., San Rafael. Free intro to computers class at 6:00 pm. Call: (415)927-2909. [Exp. #116.]

Peninsula Computer Club. Meetings: 2nd Thurs., 7:00 pm, Social Room, 222 Laurel St., San Carlos. DOS and CP/M libraries. Call: Larry Welling, (415)593-9981. BBS (415)571-9259. [Exp. #120.]

San Francisco Business Computers. Meetings: 4th Tues., 5:30 pm. For those who use computers in business. Visitors $5. Call: Jordan Rosenberg, (415)788-5338. [Exp. #117.]

San Francisco PC Users Group. Meetings: 3rd Tues., 6:15 pm SIGs, 7:30 pm General Meeting. Fort Mason, Bldg. A. Call: (415)979-5879. [Exp. #120]

South Bay WordPerfect User Group. Meetings: Monthly, dates vary. Saratoga Community Library. Free. Call: Scott Maiden, (408)253-4591. [Exp. #120.]

Stanford Palo Alto Area User Group. Meetings: Last Wed., 7:30 pm, Varian Aud., Stanford. Call: (415)329-8252. [Exp. #119.]

INTERFACE DESIGN

IICS Human Interface SIG. Meetings: Last Tues., Medius IV, 52 Colin P. Kelley Jr. St., Suite 101, San Francisco. Come join us for a rowdy probing of workable and nonworkable interface designs. Call: (415)905-6959. [Exp. #115.]

LEGAL

SF Bar Assoc. WordPerfect User Group. Meetings: 3rd Wed., noon, SF Bar Assoc. Boardroom, 7th fl., 685 Market St. Brown bag meetings. Call: (415)421-5650. [Exp. #119.]

MACINTOSH

A32 Macintosh User Group. Meetings: 2nd Sat., 10:00 am, Sunnyvale Community Center, 550 Remington Ave., Sunnyvale. Question and answer, guest speakers, disks-of-the-month, bimonthly newsletter, $35 annual dues. (408)263-0398. [Exp. #118.]

BMUG—Berkeley Macintosh User Group. Meetings: Every Thurs., 6:00 pm, Physical Sciences Lecture Hall, UC Berkeley Campus. Call: (510)549-BMUG. [Exp. #115.]

Diablo Valley Macintosh User Group (DVMUG). Meetings: 3rd Tues., 7:00 pm, Old Republic Title Co., 3000 Clatyon Rd., Concord. Get together w/Mac and Performa users. Enjoyable SIG meetings. Call: (510)827-5775. [Exp. #116.]

Gay Macintosh User Group. Meetings: 4th Mon., 7:00 pm, New Conservatory Theatre, 25 Van Ness, San Francisco. GMUG is a nonprofit group open to everyone. Call: (415)552-GMUG. [Exp. #117.]

International Macintosh Users Group (IMUG). Meetings: 3rd Thurs., 7:00 pm, Apple Computer, R&D Campus, 1 Infinite Loop, Cupertino. A forum for people using Macintosh computers in different languages. Call: Roger Sherman, (415)859-5146. [Exp. #120.]

Macintosh SIG. Meetings: 3rd Tues., 7:00 pm, Apple Cafeteria, City Center 4, De Anza and Rodrigues, Cupertino. Sponsored by Software Entrepreneurs' Forum. Call: Jeff Cherniss, (408)356-9901, or Barbara Cass (408)854-7219. [Exp. #119.]

PAUG—Peninsula Apple User Group. Meetings: 3rd Thurs, 7:00 pm, Ampex Cafeteria, 411 Broadway, Redwood City. Beginners and advanced, question and answer, new product demos, public domain software. Call: Roger Laker, (415)367-8657. [Exp. #118.]

SPC Apple User Group. Meetings: 2nd Tues., 7:30 pm, Fremont Main Public Library. The Society for Prevention of Cruelty to Apple Computers Users Group supports all Apple and Macintosh computers. Call: Dean Fearn, (510)881-9160. [Exp. #119.]

Stanford Macintosh User Group (SMUG). Meetings: 1st Mon., 7:00 pm. Call: (415)363-2446. [Exp. #116.]

MARKETING

Marketing SIG. Meetings: 4th Thurs., 7:00 pm, Cubberley Community Center, Rm. H-1, 400 Middlefield Rd., Palo Alto. SIG of Software Entrepreneurs' Forum. Call: Bill Ryan, (415)615-7906. [Exp. #117.]

MULTIMEDIA

Design SIG. Meetings: 3rd Tues., 6:00 pm. For independent businesspeople in graphic arts and word processing. Topics related to running own business. Call: Bill Brent, (415)282-7368. [Exp. #118.]

Macromedia User Forum. Meetings: 1st Wed., 7:00 pm, 600 Townsend, at 7th St., San Francisco. Authoring, 3-D, content, and tools. Call: (415)252-2295. [Exp. #120.]

Multimedia SIG. Meetings: 1st Thurs., 7:00 pm. SIG of Software Entrepreneurs' Forum. Call: Ralph Gilman, (408)746-0551. [Exp. #115.]

Multimedia User Group. Meetings: 1st Wed., 7:00 pm, Contract Design Center, Main Lobby, 600 Townsend St., San Francisco. $3 at door. Call: John Dowdell, (415)665-3916. [Exp. #116.]

North Bay Multimedia Association (NBMA). Meetings: 3rd Thurs., 7:00 pm, Semantic, Novato. Call: Lee Callister, (415)883-0449. [Exp. #117.]

SEF Multimedia SIG. Meetings: 1st Thurs., 7:00 pm, Center for Software Development, 111 W. St. John Street, Suite 200, Downtown San Jose. SIG of Software Entrepreneurs' Forum. Call: Ralph Gilman, (408)746-0551. [Exp. #120.]

NANOTECHNOLOGY

Nanosystems Study Group. Meetings: Alternate Mondays, 7:30 pm, University Lutheran Church, 1611 Stanford Ave., Palo Alto. The study group will go through Eric Drexler's book, *Nanosystems: Molecular Machinery, Manufacturing, and Computation.* Announcements and mailing list, contact: Ted Kaehler, email: Kaehler2@AppleLink.Apple.com. Phone: (408)974-6241. [Exp. #115.]

The Assembler Multitude. Meetings: every other Mon., 7:30 pm, University Lutheran Church, 1611 Stanford Ave., Palo Alto. An open discussion of new technical developments in Nanotechnology and social consequences and dangers of Nanotechnology. Organized by Ted Kaehler. Email: Kaehler2@AppleLink.Apple.com. Address: 20525 Mariani Ave., MS 301-3D, Cupertino, CA 95015. [Exp. #115.]

NETWORKING

NetSIG. Meetings: 4th Tues., 7:00 pm, Novell Sunnyvale. Networking SIG for Software Developers. SEF group. Call: Skip Addison, (408)283-3545. [Exp. #117.]

NOVELL

Silicon Valley Novell User Group. Meetings: 3rd Wed., 6:30 pm, Sundowner Inn, 504 Ross Drive. Call: Stephanie or Beth, (408)522-8690. BBS: (408)739-8753. [Exp. #120.]

OS/2

Monterey Bay And NPGS OS/2 User Group SIG. Meetings: 2nd Thurs., 7:00 pm, Spanagel Hall, Naval Postgraduate School, Monterey. Demos and product evaluations, question and answer sessions, assistance w/setup. Call: Michael Schievelbein, (408)656-2520 (days). [Exp. #115.]

OS/2 Bay Area User Group. Meetings: 4th Mon., 7:00 pm. For anyone interested in OS/2. Presentations, demos, q&a. Call: (415)755-3124. [Exp. #116.]

PARADOX

Bay Area Paradox User Group (bapals). Meetings: 4th Tues., except June and July, 4th Wed., 4:30 pm, SF City College, 800 Mission St. Call: (415)995-4688. [Exp. #119.]

PEN COMPUTING

Pen Software SIG. Meetings: 4th Wed., 7:00 pm, Cubberley Community Center, Rm. H-1, 400 Middlefield Rd., Palo Alto. SIG of Software Entre-

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preneurs' Forum. Call: Bill McAlpine, (415)348-2257. [Exp. #117.]

PROGRAMMING LANGUAGES

SEF/SVCS Visual Basic SIG. Meetings: 2nd Thurs., 7:00 pm, Cubberley Comm. Ctr., Rm. H-1, 4000 Middlefield, Palo Alto. Call: Allan Colby, (415)851-4657. [Exp. #117.]

Silicon Valley FIG. Meetings: 1st Mon. after 1st Sat., 7:00 pm, Membership in the Silicon Valley Chapter of the Forth Interest Group is separate from International FIG. Call: Henry Vinerts, (510)790-3945. [Exp. #115.]

Silicon Valley Forth Interest Group. Meetings: 4th Sat., 10:00–5:00 pm, Applied Biosystems, Inc., Conference Room A/B, 230 Lincoln Centre Dr., Foster City. Call: C.H. Ting, (415)571-7639. [Exp. #119.]

Visual BASIC SIG. Meetings: 2nd Thurs., 7:00 pm, Cubberley Community Center, 4000 Middlefield Rd., Rm. H-1, Palo Alto. Sponsored by Software Entrepreneurs' Forum. Call: Allan Colby, (415)851-4567. [Exp. #117.]

Visual C++ Bay Area Developer's Group. Meetings: 3rd Wed., 6:00 pm, Berkeley. For agends, location, and RSVP, Call: (510)254-9700, ext. 490. [Exp. #117.]

TEXAS INSTRUMENTS

TI-99/4A. Meetings: 2nd Sat., Oakland. Call: Fred, (510)530-8335. [Exp. #115.]

UNIX/XENIX

N. California UNIX SIG. Meetings: dates vary. UNIX, XENIX, LINUX, Coherent. Beginners welcome. Call: Randy Just, (707)769-1648. BBS: (707)754-1431. Email: rjust@justcomp.com. [Exp. #120.]

UNIX SIG. Meetings: 2nd Tues., DEC Aud., 130 Lytton Ave., Palo Alto. Sponsored by Software Entrepreneurs' Forum. Call: (415)546-4950. [Exp. #117.]

UNIX/Xenix SVUG. Meetings: 3rd Wed. 7:00 pm, Call: (408)745-7600. Fax-On-Demand info: (408)745-0740. [Exp. #116.]

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Video Toaster User Group. Meetings: Last Thurs., 7:30 pm, HT Electronics, 275 N. Mathilda Ave., Sunnyvale. Special guests, equipment demos, hands-on workshops, plus info/tips on new System 3.0. Call: Andrew Timmins, (408)243-9233 (eve). [Exp. #120]

VIRTUAL REALITY

Silicon Valley Virtual Reality. Meetings: 2nd Thur., 7:00 pm, 922 Wedell Ct., Sunnyvale. Open forums, info sharing, and technology developments. Call: Algis normantas, (408)745-7600. [Exp. #116.]

WINDOWS

BMUG Windows Programmers SIG. Meetings: 1st Tues., 6:30 pm, 2055 Center St., Berkeley. The Programmers SIG is a forum for Windows programmers of all levels to meet and exchange information. Call: Ferdinand Rios, (510)526-3031. [Exp. #115.]

Windows SIG North. Meetings: 2nd Wed., 7:00 pm, Univ. of Calif. Richmond Field Station, 1301 S. 46th St., Bldg. 454, Richmond. Software Entrepreneurs' Forum. $10 for nonmembers. Call: Barbara Cass (415)854-7219. [Exp. #120.]

Windows SIG South. Meetings: 1st Wed., 6:30 pm, Cubberley Community Center, Room H-1, 4000 Middlefield Rd., Palo Alto. Software Entrepreneurs' Forum. $10 for nonmembers. Call: Barbara Cass, (415)854-7219. [Exp. #120.]

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Continued from page 198

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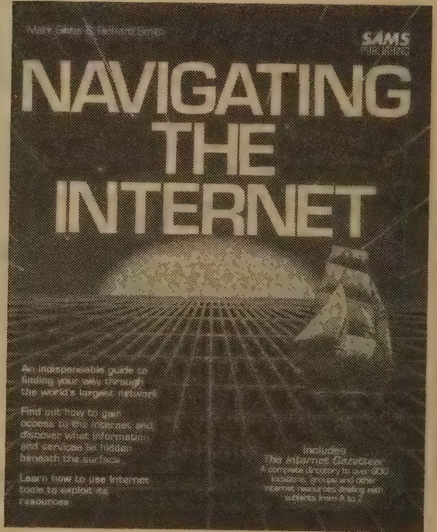
Reviewed By: Birrell Walsh

The Internet is full of information. We can search for files, remotely log on to systems on other continents, and transport documents thousands of miles for our own use. It's a resource we all need to know about, but somehow we "haven't gotten around to it."

Could you possibly be like me, eager to explore the Internet but intimidated? I knew that the often-opaque UNIX-style commands would not explain themselves. I went to the bookstore and had the good fortune to select Mark Gibbs and Richard Smith's *Navigating the Internet.*

It begins with a history of the Internet and a bit about how to get connected. The bulk of the book is how-to's: how to use Email on the Internet, how to retrieve files with FTP, how to visit other sites with telnet.

You will find introductions to USENET and LISTSERV, which let you keep up with discussions on your favorite obsessions. There are almost two hundred pages of LISTSERV topics—dare we suspect we are paying for someone's database dump here?—and a tear-out command card for email, FTP, telnet, and gopher.



I particularly appreciated the introductions to gopher, WAIS, archie, and WWW. They are systems to help you find information in the tunnels of the network. Within a half hour of trying out *Navigating the Internet*'s suggestions, I found invaluable resources in North Carolina, Italy, and Australia. The book certainly paid for itself in the first day of use. (SAMS Publishing, Inc., 11711 N. College, Carmel, IN 46032. 317/581-3500) ■

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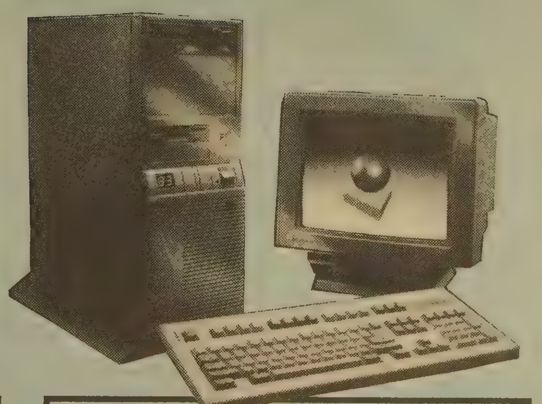

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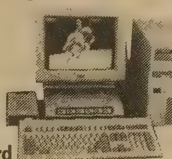

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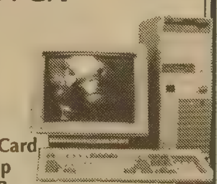

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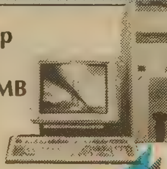

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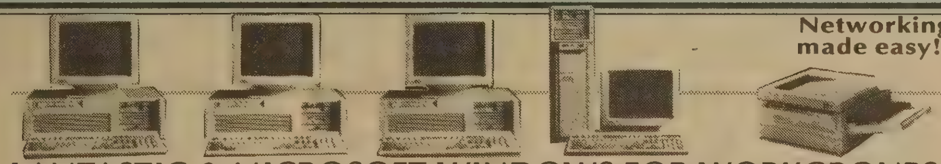

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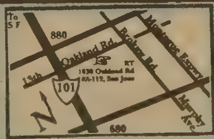

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continued from page 52

purposes, of an independent contractor relationship are numerous. They include whether or not the employer is required to 1) withhold federal income taxes, 2) collect and pay Social Security taxes (FICA), 3) pay unemployment taxes (FUTA), and 4) take into account the worker's compensation needs for purposes of the nondiscrimination rules governing employee benefit plans; as well as if the employer is subject to various state employment tax requirements.

If you're working for someone else, or if someone else is working for you, it is important to ensure that whatever treatment you had intended is respected for tax purposes. In many cases, the results will be clear and predictable based on IRS guidance discussed below. Other times, you may wish to obtain a private letter ruling from the IRS before signing on the dotted line. Under this procedure, you ask the IRS to specifically bless the proposed transaction.

Whether an individual is an employee or an independent contractor is based largely upon the common law test of control. Generally, an employer-employee relationship exists when the boss has the right to control and direct the worker, not only as to the result to be accomplished but also by the details and means of how the work is to be done. The IRS has a twenty-factor test on which it relies in making such determinations. Application of the test, unfortunately, involves a degree of subjectivity and uncertainty.

Simply because a relationship is called an independent contract doesn't mean it will be respected as such for tax purposes. But, assuming it is, an independent programmer would likely be subject to considerably more taxes than would an employee.

Under the IRS revenue ruling that sets forth this twenty-factor test, no single fact is conclusive, and the degree of importance of each factor varies according to the factual context in which the services are performed. The citation for this ruling is Rev. Rul. 87-41, 1987-1 C.B. 296, 298-99, if you have convenient access to legal resources, or please feel free to call my office for a copy.

SOME REAL-LIFE EXAMPLES

The IRS has issued several private letter rulings dealing specifically with whether or not a computer programmer is an employee. Although these rulings can't be cited as precedent, they are nevertheless a valuable source of guidance. They are presented here as examples of the consequences, happy and sad, of various business strategies.

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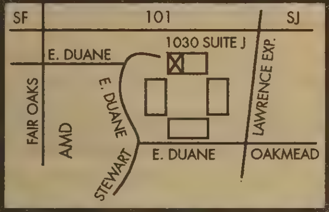

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486DX-50	$3145	$1745
486DX2-66	$3255	$1775

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1. 1 Year parts & labor warranty on systems
2. Prices & availability subject to change w/o notice
3. Shipping, insurance and COD charges are additional & non-refundable
4. Return shipping must be insured and bearing a RMA # on the shipping label
5. Defective items replaced or repaired at our discretion
6. Not responsible for typographic
7. All returns are subject to 15% restocking fees and cover only computers, excludes peripherals. No refunds after 30 days.
8. Government & Corporate purchase orders are welcome

• BEST MEMORY PRICES • HIGHER QUALITY
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1x8-60 59
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256x9-80 13
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1x1-70 .... 6.99
1x1-60 .... 6.99
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83D87-25 25 MHz 59
83D87-33 33 MHz 59
83SX87-25 16 MHz 55
83SX87-33 MHz 59
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2 MB Module 118
DeskPro 286N, 386N
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2 MB Module 99
Mdls 55SX: 65SX: 55LS, 65LS
4 MB Module 159
Mdls 80-111; 121, 311, 321
2 MB Card 99
Mdls 80-A21; A31
4 MB Card 215
Mdls 80-A21: A31
4 MB Card 215
Mdls 90; 95
2 MB Module 159
4 MB Module 259
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Contura Lite 20/25
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In one letter ruling, the IRS held that an individual who developed software under an "Independent Contractor Agreement" was an employee for tax purposes. Despite the nominal form of the agreement, the employer had the right to control the programmer's activities and working hours. The individual was paid an hourly wage and provided the services on the employer's premises.

In another instance, an individual incorporated and entered into a contract to design and implement computer software. The IRS ruled that he was an independent contractor because he provided his own place of business, his own worker's compensation and liability insurance, and would be subject to liability if he terminated services before completing work under the contract.

In yet another situation, the president of a corporation that provided computer programming and analysis on a contract basis to other organizations sought independent contractor status for the programming and analysis that he performed. The IRS held that he was an employee of his firm, since he performed services for the corporation and received a salary.

The IRS, on one occasion, considered an individual who was hired by an insurance company to design and develop a program to produce an annual report. The project cost was subject to a maximum fee, including expenses. Either party could terminate on thirty days notice. The company provided all materials needed, and required that all work be done on the company's premises for security reasons. The company had no right to change the way the individual did her job, but she was required to report regularly to a project manager and could be reassigned to other project-related duties. The IRS held that the programmer was an employee because there was a right to control, and the individual worked at the job site and was reimbursed for expenses.

In one last example, the IRS determined that a salesperson for a computer hardware sales and maintenance company was an employee, not withstanding a written agreement stating that the salesperson was an independent contractor and requiring thirty days notice from either party for termination. The Feds placed greater weight on the fact that the salesperson worked regular hours at the company, which provided not only equipment and supplies, but also leads. ■

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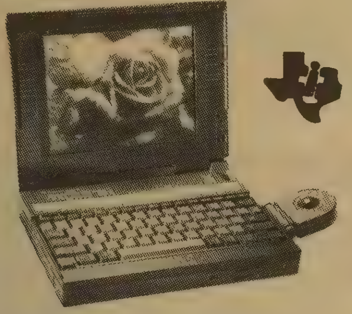
Powerful 486 Notebooks....

Texas Instruments TravelMate 4000 Computer



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1.44 Floppy Drive, 200MB HD, DOS6.
Ballpoint Mouse, WINDOWS 3.1.

BEST

486DX2/40MHZ, 8MB RAM exp. TO 20MB
SUPPORT VGA 640x480, 1024X768 Color
1.44 FD, 200mb HD, Ballpoint Mouse
DOS6, WINDOWS 3.1. Battery Pack.

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3.5 Floppy, 120mb HD, Ballpoint Mouse,
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486SX25Mhz, 4MB RAM exp to 20MB
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486DX25Mhz, 4MB RAM exp to 20MB
Support 640X480, 800X600, 1024X768.
1.44 Floppy drive, 120mb HD, Mouse
DOS6, WINDOWS 3.1, L.T. Manager

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486DX2/50MHZ, 8MB RAM Exp. to 20MB
Support 640X480, 800X600, 1024X768.
1.44 Floppy drive, 200MB HD, Mouse
DOS6, WINDOWS 3.1, Battery Pack

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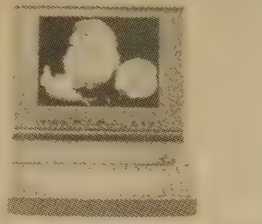
TOSHIBA NOTEBOOK

T1900/T1900C	Best
T1950/T1950C	Best
T4600/T4600C	Best

McTEK 6500 ACTIVE COLOR



- 486DX CPU, 4MB RAM EXP. TO 20MB
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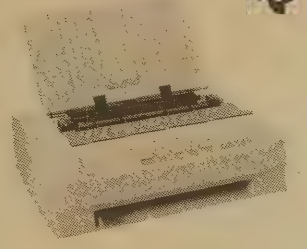
- 1.44 Floppy drive, 120MB HD, MOUSE
- DOS6, WINDOWS 3.1, PCMCIA Slot

$335933DX / **$3659**66DX

TI MicroMarc Inkjet Printer



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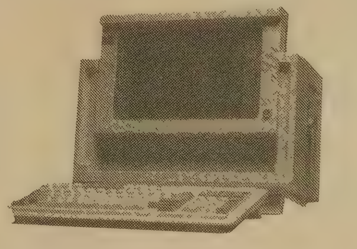

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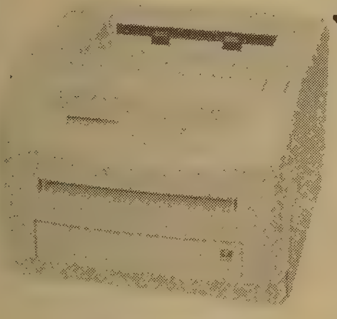
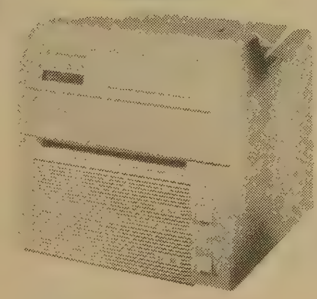


- 5PPM, 2MB RAM, 300DPI,
- Adobe Postscript & PCL4
- parallel and Appletalk

$699 PS23 **$999** PS65

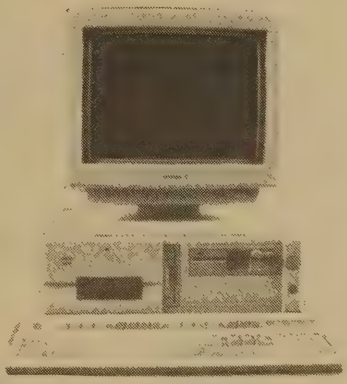
TI MicroLaser Pro

600 DPI



- 8PPM, 6MB RAM, 600DPI,
- Adobe Postscript Level 2 & PCL5
- parallel and Appletalk (auto switch)

$1339 after rebate



McTEK 486-33 / 50 66DX

Intel 486DX CPU W/256k CACHE
1.2MB FLOPPY DRIVE
4MB RAM, 250MB Hard Disk
2 Serial ,1Parallel, 1Game Port.

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4MB RAM, 250MB Hard Disk
2Serial 1Parallel 1Game Port

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Panasonic KXP2123/2124	$259/309
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Practical 14.4 Mini Tower(Mac)	$229
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- Microsoft serial mouse
- MS DOS & MS Windows 3.1
- Free software option

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- 2S. 1P. 1G.
- ET-4000 w32i VLB/2MB Video card
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- 101-keytronic keyboard
- Microsoft serial mouse
- MS DOS & MS Windows 3.1
- Free software option

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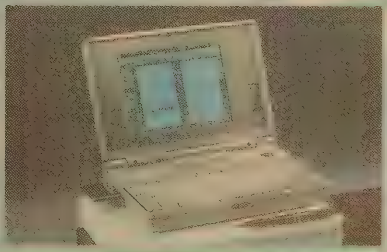

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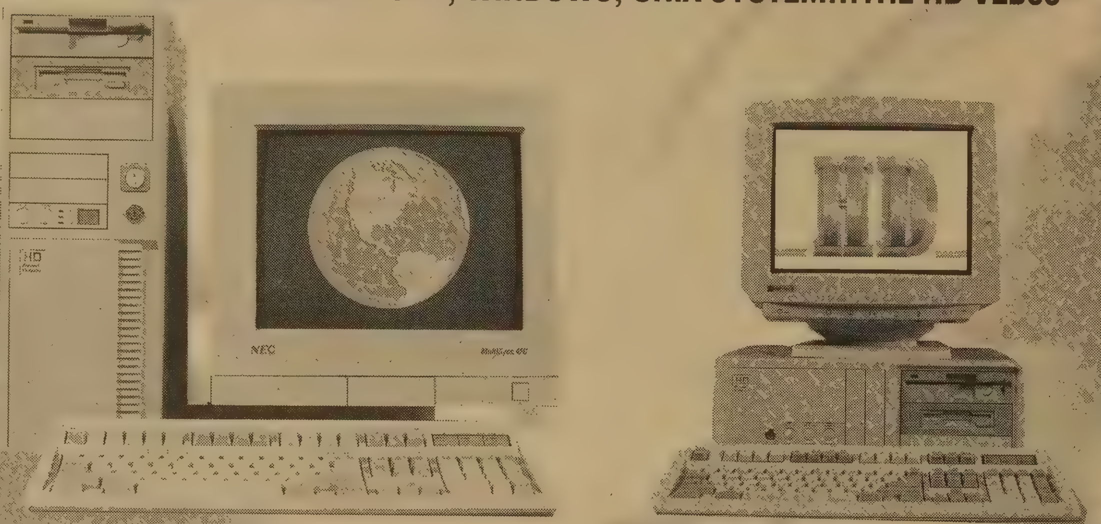

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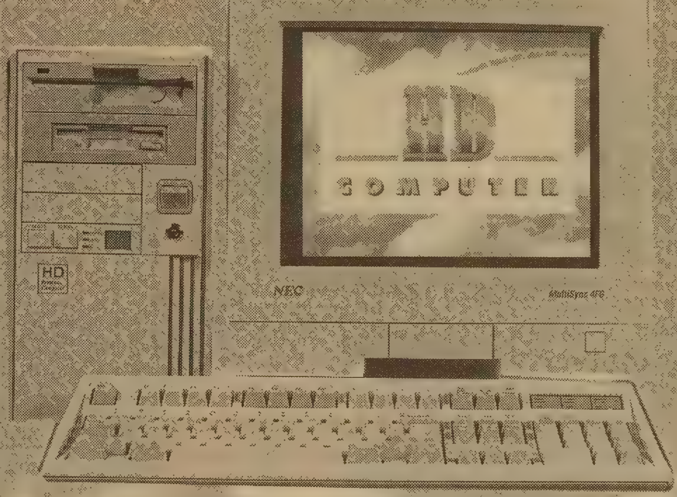

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- 101-key Enhanced Keyboard, MITSUMI
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- 32Bit EISA SCSI Controller
- 2 Serial, 1 Parallel, 1 Game Port
- 101-key Enhanced Keyboard, MITSUMI
- Mid-Tower case w/ 230W Power supply
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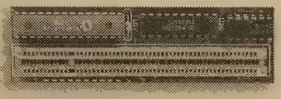

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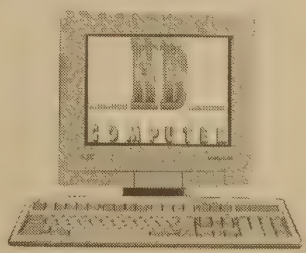

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LAPTOPS

COMPUTER OF THE MONTH:

TI TravelMate 4000E WinSX/25 Color

RESOURCES:

TravelMate 4000E WinSX/25 Color, $2499
Texas Instruments, Inc.
PO Box 6102, MS 3242
Temple, TX 76503
1-800-527-3500

Not long ago, I called Texas Instruments to inquire about a new active matrix color notebook that looked to be a winner. Top of the line—all the bells and whistles and a price tag of roughly $5000. In the course of that conversation, the TI representative told me about a new passive matrix color machine. I scoffed until I learned that the list price for this new marvel was under $2500. This might just be the best buy around for a color computer.

The TI TravelMate 4000E WinSX/25 Color notebook computer is no stripped-down model, rather it is a highly efficient 486 running at 25MHz. It comes with 4MB of RAM, expandable to 20MB. Memory costs for the upgrade start at $279 for 4MB and climb all the way to $1999 for the 16MB module.

It weighs about 6lbs., including the rechargeable NiCad battery pack and includes a 3.5" floppy drive as well as a 120MB hard drive. The machine comes standard with MS-DOS 6.0, so in a pinch you could invoke DoubleSpace and increase the capacity to well over 200MB. The computer measures 8.5" x 11" x 2.1."

Texas Instruments did their homework before releasing this machine. It has a wonderful feel and although the 10" color display is passive matrix, the quality is surprisingly good. What I liked most about the computer is the speed at which it changes from one task to another. I have seen few computers operating in the Windows environment demonstrate this kind of speed. Somehow, TI has tuned this machine to get the most out of the hardware.

Designed around Windows, the TravelMate 400E comes from the factory with both MS-DOS 6.0 and Windows 3.1 preinstalled. When you turn on the computer, it takes about fifteen seconds before it is ready to work. TI has done a number of smart things in setting up the software. For instance, they have included their own utilities that can help speed up its operations.

To help Windows users, there is a Microsoft BallPoint pointing device. This is my favorite trackball because it features a larger than typical ball thus making precise movement easier. The device plugs into a port on the right hand side of the computer and requires no installation procedure or additional cables.

TI has also paid a lot of attention to power management. Under normal use, the rechargeable battery pack will last between three and four hours. A standby mode helps prolong battery life. Other innovative software features help conserve power by making it faster to get into and out of applications. Additional packs ($89) are available.

You can easily attach any PS/2 keyboard to this machine, but TI's keyboard is the best I have seen for a computer of this size. TI contracted with Brother Industries, Ltd. to design this keyboard and it is a winner. They say it is the first notebook keyboard with a full four-millimeter travel. This makes a lot of difference in how the keyboard feels. It lets you work all day without a complaint. The placement of the keys works well. Separate keys are provided for PgUp, PgDn, Home, and End. A built-in numeric keypad, however, requires you to use the Fn key. There is, however, the option of buying an external numeric keypad ($59).

While I am quite impressed with the feel and layout of this keyboard, I look for further improvement. This is still more spongy than my favorite desktop keyboards.

Texas Instruments provides telephone support for the TravelMate should the user have any problems. Overall, this is a remarkable computer. For only a few hundred dollars more than a comparable monochrome machine, you can have a quality color notebook. The TravelMate 400E WinSX/25 is the first color portable priced within the reach of the average customer.

The TravelMate 400E WinSX/25 is the first color portable priced within the reach of the average customer.

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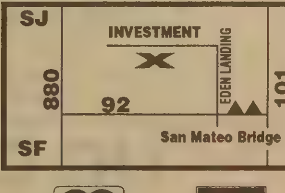

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Even with relatively uncommon, expensive large monitors, screen real estate is always insufficient for heavy multitasking. The third or fourth window open will cover the previous ones, and getting them back to the foreground is rather cumbersome in OS/2. With this utility activated in the startup folder, you only need to click twice on title bars to cycle through the open windows.

BLACK HOLE BLACKH.ZIP (OS2DF1 FORUM, LIBRARY 3)

Free PM utility implements an abstract object capable of deleting any WPS object from the desktop, including those that OS/2's shredder cannot.

Sometimes desktop objects don't have a delete option, or become undeletable by regular means (e.g. "broken shadow" icons). Dragging and dropping them on the icon of this program kills them. Use with care!

UNZIP UNZ501.EXE

Free 32-bit ZIP files de-archiver. It is fully compatible with the latest PKZIP compression formats and it handles EAs and HPFS long filenames. Self-extracting file.

All files in CompuServe OS/2 libraries are compressed in the newer, PKZIP 2.04g format, which is incompatible with previous versions. You can use DOS PKZIP to decompress them, but if you want an OS/2 utility that handles EAs and HPFS drives (more of these in future columns), this is currently the only utility available (a PKZIP OS/2 version does not exist yet). The compressing counterpart to this is also available in Library 1 as ZIP201.ZIP.

ZIP CONTROL ZIPCTL.ZIP

Shareware PM program that shields the user from the command line when using the OS/2 freeware version of UNZIP.EXE. It provides a "point and click" view of the contents of ZIP files. Files can be unzipped to a default or user-specified target directory. Highlighted files can be viewed with an editor of choice before unzipping.

Very convenient for checking and viewing the contents of ZIP files before unZIPping them, particularly to different directories.

WPS TOOLS WPTOOL.ZIP

Free set of housekeeping utilities. CHECKINI checks the desktop information in OS2SYS.INI and OS2.INI files, and cleans them of obsolete information. COPYINI backs up the .INI files, compressing any blank spaces left by deletions. REPLINI replaces current .INI files with user-specified copies. WPSBKP creates a text file that can be used to re-create most of the desktop. RESETWPS restarts the WPS.

As we shall see in future columns, information is always added to the .INI files when changes are made to the desktop, but not deleted when content items become obsolete. The continuous growth of the files slows down performance, may outgrow the disk space available, and increases the likelihood of crashes or corruption. I use CHECKINI daily to keep the .INI files lean. Highly recommended. ■

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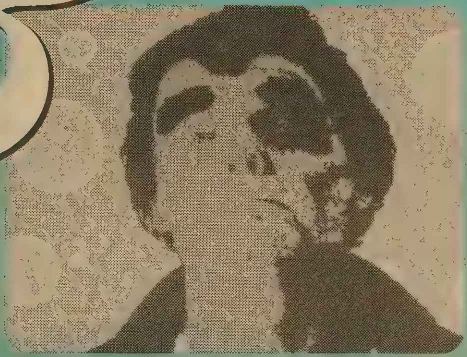

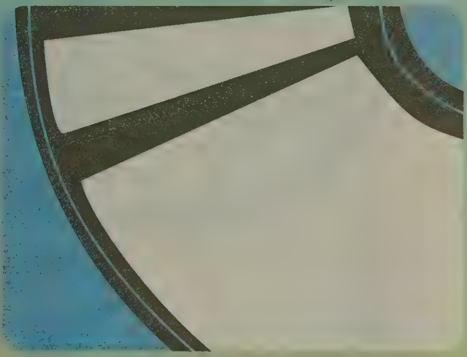

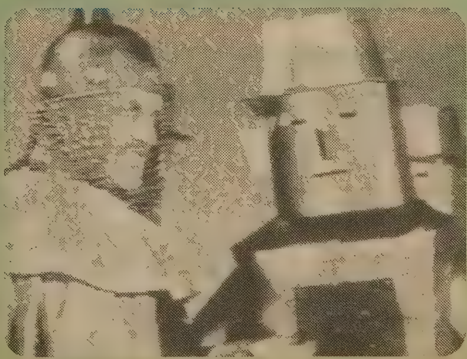

IN THIS ISSUE

seaQuest DSV;

Pioneer's LaserActive System;

Midnight Movie Madness;

Manipulating Words With Computers;

Multi Media & beyond

The Amiga Revolution

seaQuest DSV:

BY DOUGLAS J. NAKAKIHARA

A revolution instigated by Commodore Amiga and NewTek Video Toaster began with the TV movie *Babylon 5* last February, but has reached new heights with the weekly NBC series *seaQuest DSV.* State-of-the-art computer-generated images (CGI) are now being created effectively and quickly using consumer-based equipment, for a fraction of the cost of using traditional modeling or high-end graphics workstations. Truly professional tools are now in the hands of the masses.

Though the Video Toaster is mainly a video-editing device, it comes bundled with Lightwave, a 3-D rendering program that makes all of the CGI magic possible. The people at seaQuest, specifically Allen Hastings, the author of Lightwave, have a close relationship with New Tek. This often results in custom effects being written especially for the show, which eventually make their way into future public releases of Lightwave.

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SEAQUEST DSV

SeaQuest DSV (Deep Submergence Vehicle) is a story about a 1000-foot submarine called seaQuest. It's set about twenty-five years in the future, at a time when the oceans have been colonized. Originally a ship of war, the sub has recently been refitted with scientific equipment and personnel, though it still maintains an arsenal of weapons. Used primarily for exploration, it often ends up a peace-keeper.

Jim Lima, the art director for *seaQuest*, heads up Amblin Imaging, whose offices are located in the back lot of Universal Studios in Southern California. Amblin Imaging is responsible for delivering *seaQuest*'s impressive CGI. Lima's credits are extensive and impressive—he has been the art director or conceptual designer for many popular feature films, commercials, theme park attractions, and even Michael Jackson's Dangerous tour. This is one talented guy!

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Having helped put together the "bible" that sold the series to NBC, Lima feels lucky to be on the project at such an early stage in the game. As art director for the series, he designed the sets, props, vehicles, furniture, logo, colors, and materials—the "look" of the show is essentially his. This "one-man vision" gives the show a seamless quality.

As much as possible, Lima makes sure that everything in the show has a certain logic to it. Effects are not done for merely effects' sake. The main seaQuest bridge, for example, was designed to look like the walls were pushing back on the extreme pressure outside the sub. Even the logo was made "so your eyes go through it like a wave." "The word 'seaQuest should feel like water," he told me.

Basically an artist first and head of CGI second, Jim is trying to create an entirely new world—like George Lucas did in *Star Wars*—that the audience can be pulled into. Just as a painter wants his work to be more than an effective use of colors, Lima wants the CGI to be more than just great computer graphics. With the best CGI, the audience doesn't know it's computer generated.

"We average two minutes of new CGI a week—very little stock. In terms of audience gratification, it's way up there; that was always the goal when I designed the series. I want to give people what inspired me. When I look at films like *Close Encounters of the Third Kind, Raiders of the Lost Ark, ET,* or the *Star Wars* trilogy, those kinds of experiences are what people want. People are missing that," says Lima. "I feel really privileged to have been a teenager at the time to see that stuff and be inspired by it. I just think, 'What a way to pay back the kids today.' Instead of watching cop shows and amazing scary eyewitness video, you get to watch a show about imagination. Like I was inspired by Steven Spielberg and George Lucas, I hope there will be people out there that will be inspired by what I have given to the show."

Lima includes a lot of nearly subliminal effects that make the show's CGI extremely believable. If you watch the show, notice how murky the water looks. This murkiness also affects vehicle lights by giving them a finite range and making them glow faintly. "I wanted people to feel like they were holding their breath," Lima says. The underwater environment, he explains, is significantly more difficult than creating something in outer space, where everything can be rendered crystal-clear with perhaps one or two major light sources.

Although being underwater presents its own unique problems for CGI, it does have its benefits too. "As everyone knows, if you've spent any time near the ocean or near a huge body of water like the Great Lakes, it looks different all of the time. So we have the advantage, as you will see in subsequent episodes, of having water that is very ultramarine blue-black, going into greens, and going into sapphire blues, and some are a little bit purple. It is very subtle, and the audience will feel it more than anything.

"But instead of us being locked into a black field with little white dots there all of the time, we can create a different mood to that whole episode, purely based on the color and the lighting that we do our CGI in," says Lima. Furthermore, the seaQuest will also travel beneath icebergs, which "creates a whole other bizarre visual. It's really strange."

Lima explains, "One of the huge breakthroughs that we've done, which you'll

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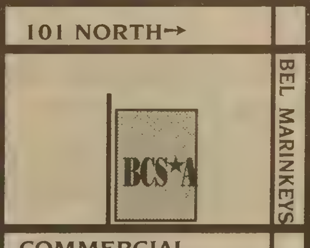

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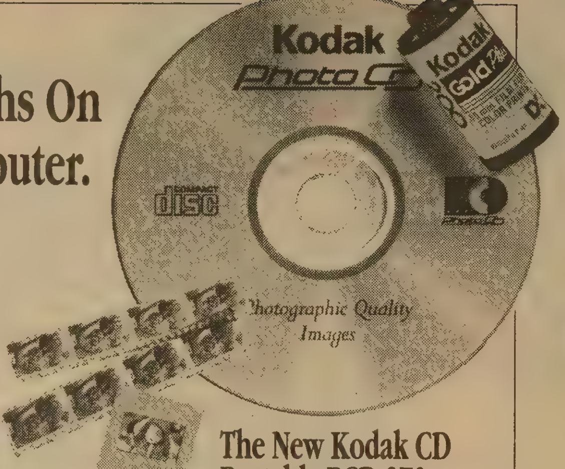

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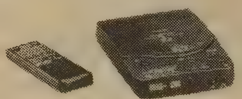

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see in subsequent episodes, is we're actually doing some shallow water shots, where you actually see the top of the water. It adds another complete dimension to the water that's just riveting."

THE AMIGA/VIDEO TOASTER ADVANTAGE

The main benefit of using the Amiga and Video Toaster is the cost savings, but it doesn't stop there. On an ongoing basis, money not spent on special effects can be allocated to other things.

Taylor Kurosaki, the digital systems coordinator, offers his thoughts on the advantages of their extremely cost-effective facility. "It allows writers the creative leeway to be able to write these big huge shows for TV. Finally, TV can be good again. With costs going up and up and up, if they were to do *seaQuest* on a higher-end system, you wouldn't have had Roy Scheider, you wouldn't have had the sets that you have, you wouldn't have had the big money. You would have had effects and that's it. It allows you to balance it out a little bit better. You've got good effects and now the whole show can be a big as the effects can be."

According to Lima, "Toaster is a wonderful machine; however, it is really still in its adolescence. That technology, where NewTek is taking it in a few years, is going to be the number-one competitor to Silicon Graphics."

"We are really utilizing every bit of the technology. We feel like the guys (the animators) are like magicians in a way, in that they figure out ways to get these machines that are so 'low-end' to do such 'high-end' stuff," adds Kurosaki. "We want to give people feature-quality effects-work faster, much faster than anyone else can. Have it look as good or better, and do it for a tenth of the cost."

Because Amblin Imaging relies on a non-mainstream computer platform, one would expect a little resistance from outside parties. "The Amiga has not hindered us in any way at all. The platform has no limitations that can inhibit us. Beyond that, it's just software, and the Amiga allows you to run the kind of software you need to run. I don't see this platform ever becoming obsolete, as long as it's going to be fast enough," says Kurosaki.

However, "there still are these kind of CGI snobs—if it's not done on an SGI then it's just a toy. This is going to shatter all of those misconceptions. Either they are going to have to change their ways—people like SGI and high-end effects houses are going to have to bring down their prices—or they are going to become as extinct as traditional effects."

CGI BENEFITS

CGI provides a much more flexible means of accomplishing special effects. Although CGI has been used extensively in films like *Jurassic Park*, the necessary Silicon Graphics workstations are just too costly to be used in a weekly television series. Shows like *Star Trek: The Next Generation* rely mainly on miniature models for special effects. Once filmed and animated, the shots become "stock footage" that can be used over and over. (A shot is basically one sequence of animation, usually not lasting more than a few seconds.) These canned shots can be simply composited over "the planet of the week" to cover the particular story, sort of like wearing different shirts with the same pair of pants to stretch your wardrobe budget. SeaQuest will use very little stock

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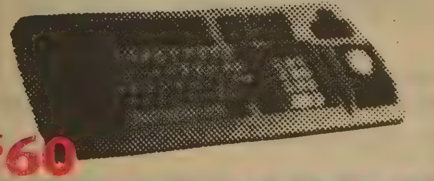

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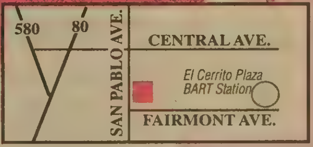

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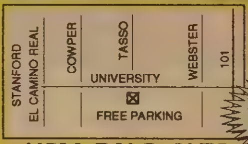

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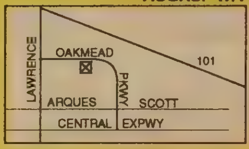

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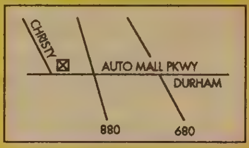

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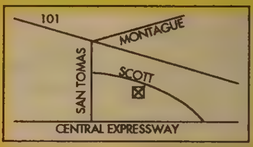

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footage for the thirty or so shots in each episode, an amount unheard of for a weekly TV series.

The seven-man team of animators is constantly working on as many as three episodes. Additionally, nearly half of their time is spent on research and development of new effects and models. They have no formal lead time; it is more or less built into their production method. At the time I visited the facility, episode four hadn't been aired yet, and they were already working on episode ten.

THE FARM

Amblin Imaging's "rendering farm" consists of thirty-six coverless Amiga 2000s fitted with Video Toasters, '040 accelerators, and 32MB of RAM. (Taylor admits that even 32MB is not enough RAM.) Each Amiga in the farm simultaneously renders different frames. If you consider that a single frame can take one to three hours to render, the farm offers considerable benefits.

In total, there are over fifty Amigas, including some A4000s, at the facility. No resource is left untapped—Amigas normally used by animators during the day become rendering machines at night. An Ethernet-based Novell local area network links the Amigas together, using Oxxi's Amiga Client software. The network also includes PCs and Macs, used in various support roles. The farm has 12GB of storage space, which soon will be increased to 25GB. This is the biggest facility of its kind in the world.

Amblin Imaging is also the site of the first Screamer, NewTek's recently announced dedicated Lightwave rendering engine, reportedly capable of replacing forty '040-based Amigas. Lima expects the Screamer to go online in about a month, but wants to make sure it is 100% compatible before being integrated into actual production. With a price tag of under $10,000 (without RAM), the Screamer represents even more cost efficiency to the company.

THE RATINGS

Defying the critics, the debut episode was the number two show for the week, behind only *Monday Night Football*. After beating the Emmys and the movie *Hunt for Red October* in the second week, the NBC show has lost some steam, falling behind CBS's *Murder She Wrote* in the 8 pm Sunday time slot. Still, it has consistently beat ABC's *Lois and Clark: Adventures of Superman* every week.

seaQuest DSV has something for everyone—a strong lead character in Roy Scheider; Darwin the dolphin, as lovable and smart as Flipper ever was; kids can identify with the computer whiz kid on the ship. Jim Lima feels the show's success is attributable to the fact it is a quality family show.

THE FUTURE

Lima explains the impact of the Amiga and the Video Toaster in this way: "The future's starting here. It's not looking toward high-end systems, but looking towards low-end systems that will allow you to make the initial investment. It's the team here that's doing it. We've been allowed to prove ourselves—and we have, on very little money, very little initial investment—and be able to do a show where we're giving people *Star Wars* on a weekly basis, which is all our dreams." ■

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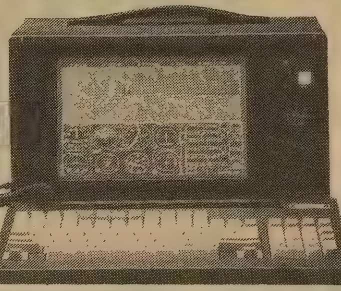

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Tony Reveaux, a San Francisco-based consultant, is the editor of Computer Publicity News, *and writes the "MediaScan" column in* Film/Tape World. *He can be reached via Usenet (luna@well.sf.ca.us) or MCIMail 290-3008.*

Steve "Mr. CD-ROM" Froelicher is president of Max Media Distributing, Inc. of Winter Gardens, Florida. He distributes almost a thousand titles in Macintosh (5%) and PC-based (the rest) CD-ROMs, and is about to add Sega CDs to his mix, "Now that there's a big enough market out there for Sega."

I asked him when he thought he might add 3DO titles, now that the players and some titles are shipping. "The market confusion now is rough," he replied. "The consumers are hearing about VIS, CD-I, and 3DO—the whole CD-ROM market, for us, is built up big enough to have an identity, but these other formats are making a lot of first-time buyers delay decisions on a gaming machine or a computer."

WHAT'S NEW: EVEN MORE WARRING STANDARDS

Sony has announced an alliance with Merv Griffin's Beverly Hills-based Griffin Group to produce a CD-ROM-based home entertainment player capable of displaying 64-bit 3-D graphics, scheduled to launch next year.

This, along with Atari's RISC-based 64-bit Jaguar player, Commodore's Amiga CD32 with a double-speed CD-ROM drive, the announced Nintendo/Silicon Graphics 64-bit MIPS RISC 3D Project Reality, player and Sega's new 32-bit player with a Hitachi chip (the latter two due in a year or so), does indeed produce a bit of market confusion, for veterans like Froelicher as well as for those of you trying to decide which hardware horse to ride into the great multimedia roundup in the sky.

And now I'm going to add to that confusion the Pioneer LaserActive multi-entertainment system, with the interactive LD-ROM and Mega-LD optical disc formats.

Because it is very interesting. The LaserActive system is not just one format, but a veritable Bronx Zoo of more formats on one machine than you will probably ever want to see again. As such, it suggests many of the things that we may want multimedia to do for us.

continued on page 280

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486DX2-66C ISA	469	629	819	869	949	999	1,009	1,059
486DX-50C ISA	416	576	766	816	896	946	956	1,006
486DX2-50C ISA	356	516	706	756	836	886	896	946
486DX-33C ISA	296	456	646	696	776	826	836	886
486SX-33C ISA	166	326	516	566	646	696	706	756
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486DLC-40C ISA	179	339	529	579	659	709	719	769
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486SLC-40C ISA	126	286	476	526	606	656	566	716
486SLC-33C ISA	96	256	446	496	576	626	636	686
386DX-40 ISA	106	266	456	506	586	636	646	696
386SX-40 ISA	76	236	426	476	556	606	616	666
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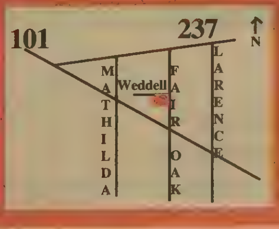

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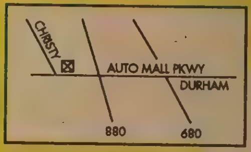

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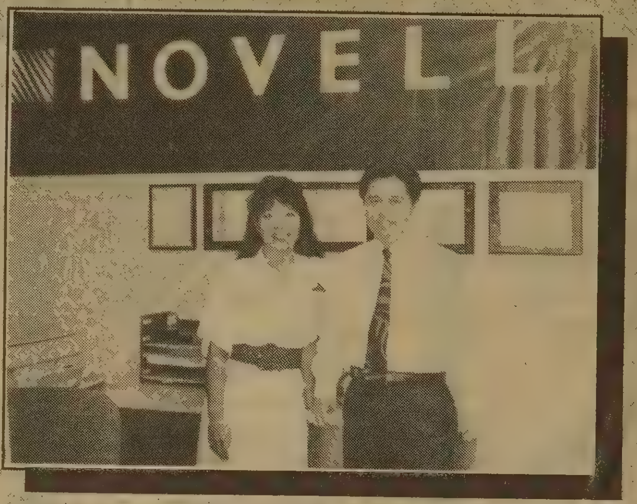

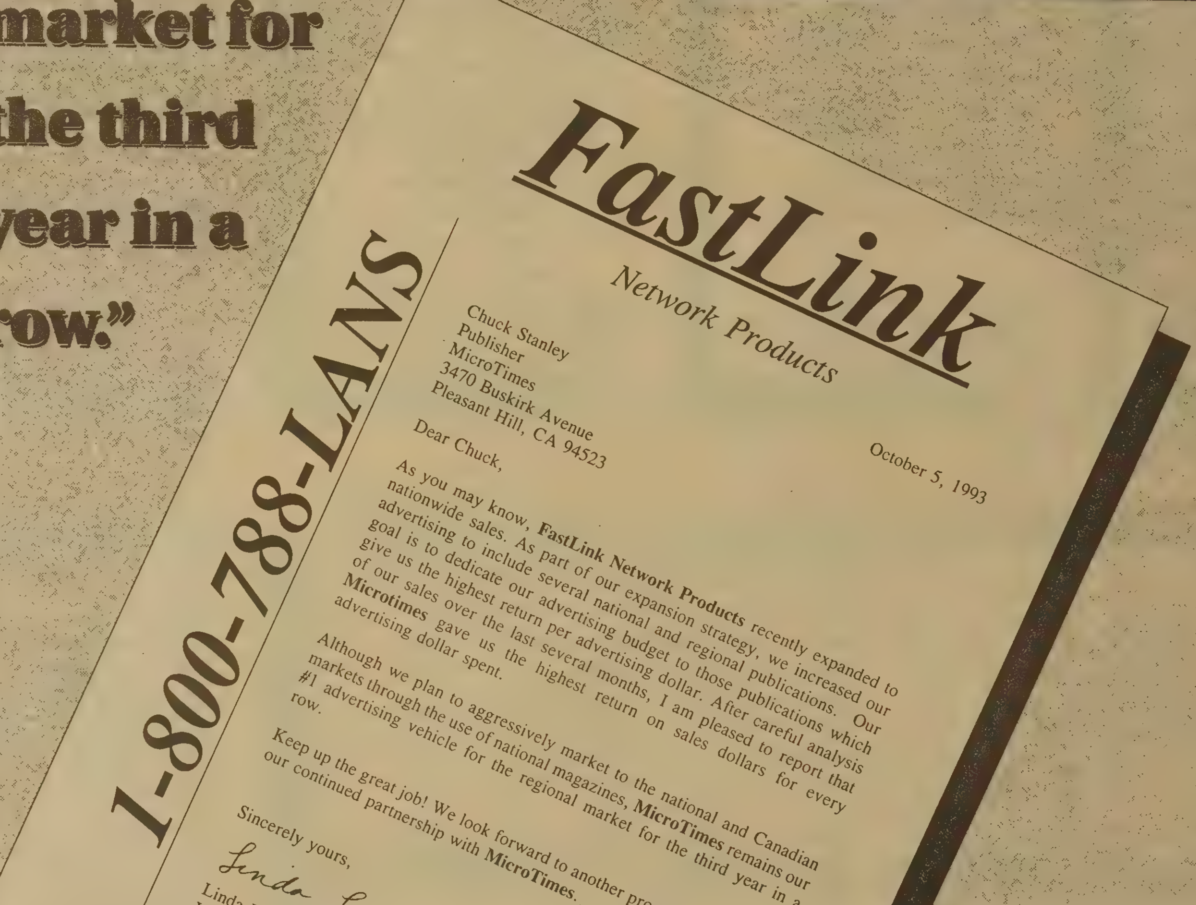

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October 5, 1993

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continued from page 274

LASERACTIVE: ANALOG AND DIGITAL

Let's start with the main box of the Pioneer LaserActive system. On sale through consumer electronics retailers, the main unit lists for $970. It is a top-of-the-line laser disk combi player outputting 425 lines of horizontal resolution. The powered disc drawer has a terraced well that will accept 12" CAV or CLV LaserDiscs, 3" and 5" CDs, and 8" CDVs. All that and a separate drawer for audio CD discs. The remote control can handle most of the commands for all these discs, including 10-key direct chapter/track search, 8-bit digital field memory for special effects, and optical-digital output.

The most interesting thing is the LD-ROM and Mega-LD optical disc formats. With reports of the impending death of interactive LaserDiscs as the multimedia format of the future, rumors abounded that Pioneer was working on finding some way to combine analog and digital stored files on the same disc, in a way that could be controlled as interactively as a CD-ROM. They were, and it's pretty impressive. Though I should add right here that, good as it is, there is not too great a chance of it finding much market penetration in this country.

A CD-ROM disc carries up to 540MB of data. A LaserActive disc, which is either LD-ROM or Mega-LD, carries the same 540MB of digital data, plus sixty minutes of analog motion picture and FM sound. If the software is written to call for it, the system can merge digital and analog images on the same screen, such as game sprites over a photographic background. It's the best of both worlds. To play the LaserActive discs, you need either an LD-ROM or a Mega-LD control pack with its cord-attached control pad.

> I have played the four LaserActive titles available thus far, and I have seen the future look of desktop multimedia.

There's even more. These packs, or "PACs," each listing for $600, are game machine adapters and processors that slide into a port in the LaserActive player. The PAC-S10, or Mega-LD pack, can play 8" and 12" Mega-LD discs, plus Sega CD discs, Sega Genesis ROM cartridges, and standard CD-G discs. The PAC-N10, or LD-ROM pack, can play 8" and 12" Mega-LD discs, plus NEC Super CD-ROM discs, ROM cards (TurboChip), and standard CD-G discs. This gets to be a veritable CyberAction City. There is also a Karaoke

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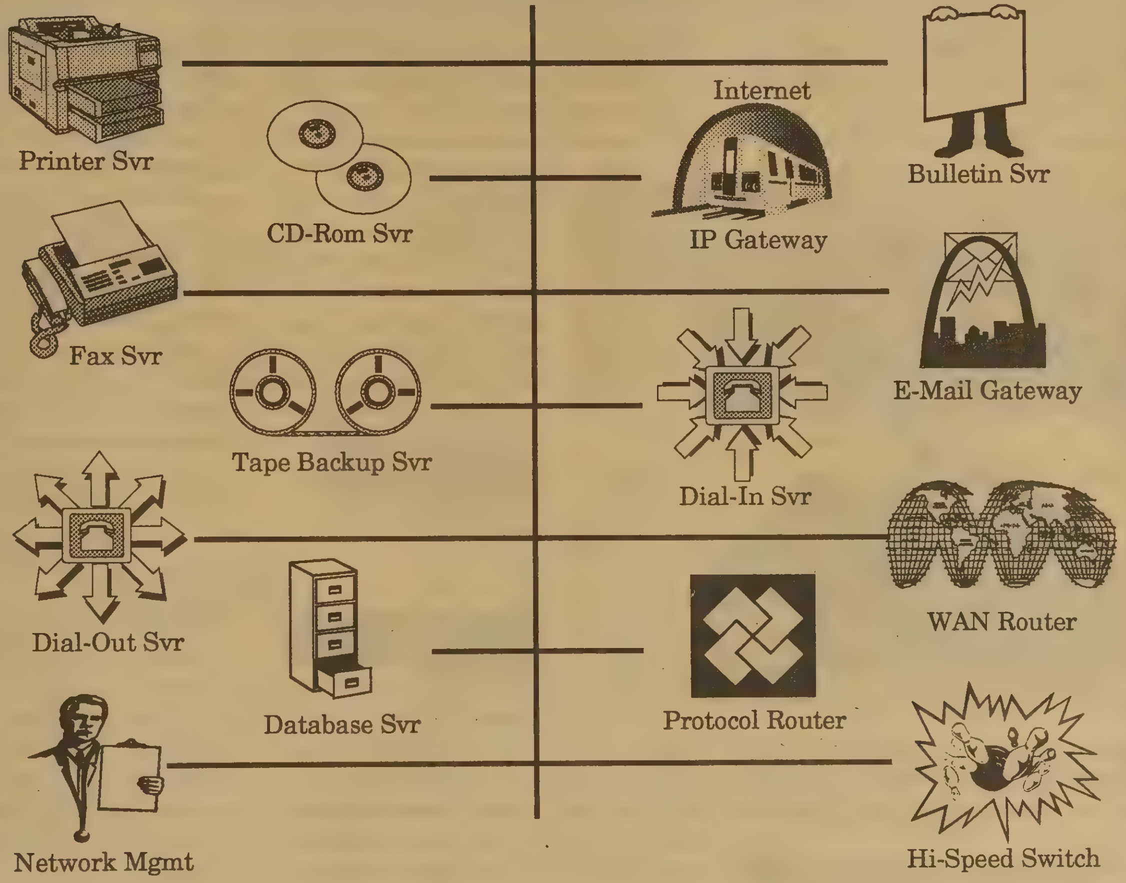
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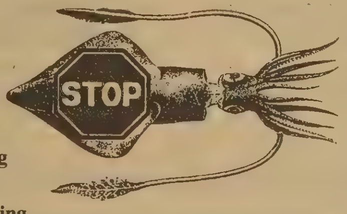

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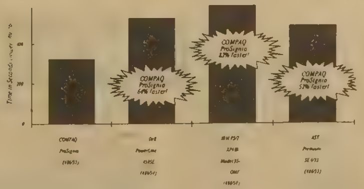

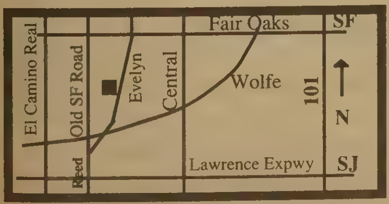
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Pack, the PAC-K1, which has a mike input and audio modes and 24-track programming. I have been testing the Sega and NEC packs (I prefer the crescent-shaped Sega control pad over the rectangular NEC module), but I have too much compassion for my neighbors to test out the Karaoke device.

Now, you can buy a complete CD-playing Sega game machine at Toys 'R Us for under $230, so why would you want to spend at least a couple of hundred more for a Pioneer pack? Each one of the packs is also the LaserActive pack and controller, so you need one for that function if you want more than a combi player. Otherwise, who's talking practical necessity here?

The one thing you won't find on the LaserActive player is an RS232 port that will accept a linkup to your Mac or PC to use computer interactive laser discs. Nor can you expect to play Mac, Windows, MPC, or other computer controlled CD-ROMs. As versatile as it is, the LaserActive doesn't pretend to be other than a ten-armed home entertainment machine. But more PC-originated and other titles are being ported to Sega CDs, and that format is seeing a maturing of more advanced multimedia development for a wider range of content.

TITLES

Having played the four LaserActive titles available thus far, I have seen the future look of desktop multimedia. The quality of the digitized video on multimedia CD-ROMs gets better all the time as stronger compression algorithms and formatting procedures are invoked. Sometimes, as in IBM-based DVI (Digital Video Interactive), what you see on the monitor almost begins to look as good as you are used to receiving from broadcast video.

Remember the last time you saw a LaserDisc being played? It was so much better than TV that it may have reminded you of seeing a 35mm theatrical movie. That's how good the picture is in LaserActive. What's tingly and eerie about it is that it was combined with the control and display graphics of a computer application—which were as sharp as on a graphics workstation. And, someday, that's the quality that developers will achieve on a CD-ROM.

"Pyramid Patrol" is a vivid and stunning arcade fighter chase game produced by Taito, one of the best game design houses in Japan. The difference between this and the many other similar shoot-'em games on Sega CD and DOS is that the quality of the graphics and the backgrounds is as good as many movies in their resolution. And, in the movies and TV, more and more of those objects and effects are produced with computers like Newtek Video Toasters (wait up for the new series of *Babylon V* starting in January).

"I Will" is a delightful, if slow, live-action interactive crime and detection game which includes picture postcard footage of London and the English countryside. You cut to graphics screens which keep track of your money, time, mileage, clues, and addresses. A kiddie-type driving map gets you from one location to another.

"Econosaurus" is an edutainment piece based on the Japanese comic strip *In the Days of the Econosaurus.* It good-naturedly quizzes you about global environmental preservation, with animated dinos and video footage of nature.

"The Great Pyramid" is a decent educational overview of four thousand years of Egyptian history, with excellent cinematography. The "game" part of it is weak, but overall it is very well done and treats the subject matter with respect.

Most of these titles include both English and Japanese voice tracks.

Upcoming LaserActive titles for this year include "Vajra," a 3-D shoot-the-demons-with-your-robot science fiction game; "Manhattan Requiem," a live action interactive detective drama, probably not unlike "I Will"; "Space Beserker," and the title tells it all; "High Roller Battle," a chopper rumble with video backgrounds; and "3-D Museum," a showcase of great works of art.

As good and stunning as these titles are, it's doubtful that "Mr. CD-ROM" will need to save shelf space for them soon. Not because these different player technologies aren't good—there are just too many of them turned on in the same place at the same time. ■

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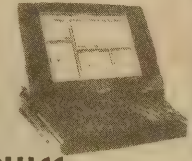

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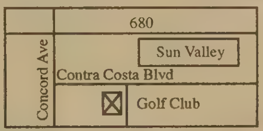

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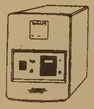

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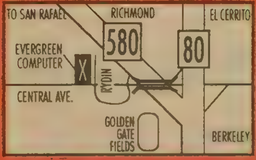

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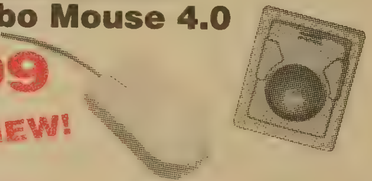

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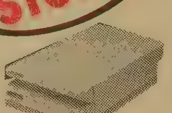

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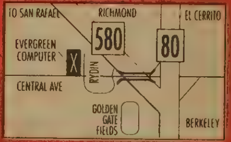

Midnight Movie Madness— A Case Study

BY JONATHAN E.

Copyright © 1993 by Jonathan E. All rights reserved. Jonathan E. has worked with desktop multimedia since 1988. He also writes about world music and the Archaic Revival for BAM. *His USPS mailing address is c/o SoundSwell, 5429th St., Richmond, CA 94804. Email: jeve@well.sf.ca.us.*

Midnight Movie Madness With Gilbert Gottfried is an MPC CD-ROM title that combines filmclips, original video, screen text of historical facts and trivia, with comedy and a quiz game. It covers one hundred science-fiction, horror, and monster movies from the 1940s through the 1970s that are considered to be classics of the bygone age of drive-in theaters. The CD-ROM illustrates one of the most important attributes of multimedia in that this package couldn't work nearly as well in traditional media or a combination thereof.

It also illustrates a sense of authorship and personality that will likely be even more widespread in the future as fledgling multimedia creators spread their wings to soar in the sky of contemporary culture, as multimedia becomes more like other avenues of personal expression and entertainment rather than just vast realms of compiled information. *Midnight Movie Madness* is not the first CD-ROM with personality, but its cracked and skewed humor mark it as a significant departure from the serious worlds of encyclopedias and educational products or from adventure and fantasy games—although it uses elements of all those genres.

This humor is not surprising when you consider that *Midnight Movie Madness* was concocted by SBD Productions, a small Bay Area start-up company consisting of two former editors of *The National Lampoon*, Mark Howard and Eric Goldberg, and an expatriate British programmer with that country's classic twisted sense of humor, Tim Glasser.

THE SPIRIT OF THE DRIVE-IN

The intellectual level of *Midnight Movie Madness* becomes immediately apparent as Goldberg, who is by far the more talkative of the two Lampooners, explains its thesis, "In 1957, four kids went to a drive-in movie and they didn't have enough money to all get in, so one of the kids had to sneak in in the trunk. Once they'd got in, the

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> The CD-ROM illustrates one of the most important attributes of multimedia in that this package couldn't work nearly as well in traditional media or a combination thereof.

other three guys met up with a bunch of girls in the drive-in before letting their friend out. They went off with the girls and left him there inside the trunk."

Enquiring minds ask, "How come the car's left in the drive-in?" To which Goldberg's reply is, "Well, if you really think about it that much...." He then elaborates, "They lost the key and they just left him there. We actually had a really nice car too that we used on the set. And the story picks up with Gilbert Gottfried as an investigative reporter. He's doing a story on this car and he's found the key that opens the trunk. In this created world, he's going to open up the trunk on national television and they're going to see what's inside of it. He builds it up with all this hoopla about the trunk and what horrible things he's going to find. He also mentions that there's a curse on the trunk for whoever opens it. Of course, he's got ratings to think about. So he goes to open up the trunk and gets zapped, flies back, decides that it's really not that important now, he's got other things to do, and he leaves the set. The camera closes in on the car. At that point the trunk flies open, we've got kind of a multimedia explosion with sound effects, and the Spirit Of The Drive-In comes out from the trunk. He gives this Aladdin speech that now that you've let him out of the trunk that if you don't pass his test of Midnight Movie Madness, you'll have to take his place inside the trunk."

THE GAME

What follows this introduction are one hundred screens with Mark Howard playing the part of the Spirit Of The Drive-In on the left side of the computer screen, a movie-clip window in the upper right, a text box on the lower right, and a simple control panel in the lower left corner. The text box displays either straightforward facts about the movie, its title, the year it was made, its director, and the studio; or a brief synopsis of its plot and some anecdotal trivia about its star, director, or some other related arcana; or the quiz game; or your score. The choice is made by using the selection bar immediately above the box. In addition, there is a simple menu bar across the top of the screen. This allows the user to select the View to be quarter or full screen for the movie-clip playback; to select the movies based on Options such as decade, director, star, Men In Gorilla Suits, Big Monkeys, Robots, Bad Dinosaurs, or Space—The Phony Frontier; or to access Help. The screen design by Glasser is simple but effective with a flashy, new wave/MTV feel, while the dialog boxes have that standard clunky Windows look.

The Spirit Of The Drive-In introduces many of the movies with a joke, but much of the humor comes from playing the quiz. Each question has three multiple-choice answers. The first two answers are serious possibilities but the third answer is for laughs. As Goldberg explains, "The quiz aspect of it is a pretty old format of humor. You really set things up with A and B and then C is always the punchline." The movie clips themselves also have a certain campy humor value, and the trivia also displays some dark humor with jokes about an actor who would only work when his mother-in-law was in town or a director who was so inept that he failed in his suicide attempt on the opening night of his absolutely awful movie and eventually died from excessive dieting.

It is not necessary to know the actual movies themselves to figure out the answers. Between the clip or the trivia, the answer is always on the CD-ROM. The Spirit has ten possible reactions to the answers: one if it's the wrong answer and a random choice from nine possible reactions if the answer is right. You can check your score at any time.

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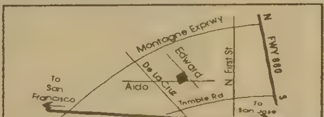

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PLAYABILITY & HUMOR

When asked about how long they feel that *Midnight Movie Madness* will be entertaining and how it will be used, the principals of SBD respond with varied but consistent answers. Glasser initially replies that he thinks, "People could pop it up for an hour or so every week," and then adds, "When you're at the computer and feel a bit bored, you could check it out again. It's like asking how long you will listen to a record. Some people will listen to it for a long time and some people will get a lot out of it even though they just listen to it once."

Goldberg believes, "It depends a lot on how you personally play games or use games like this. There are so many different ways of using it. You can take the quiz in lots of different ways. You could play the sci-fi only, or just the Vincent Price. I think it has a different kind of playability from an adventure game where you and your buddies get a six-pack of beer and go through it, try to map it out, and finish it by the end of the weekend. I think it'll have more of a life than those products where, after you've done it, that's it. Something like this you can use again." He thinks that it will continue to be interesting as a reference guide to the movies either after you have actually seen one or as an introduction for friends.

Howard envisions it "as a computer coffee-table book. You have friends come over and you can go, 'Come here, take a look at this. This is neat.'"

Goldberg then adds, "This would be the perfect game to be played on the toilet, if you could just hook it up so you could play while you went to the bathroom. 'Cause that's kind of what it's like, the equivalent of a book that you keep on the ledge near the can so that when you're sitting there for ten minutes or so you can leaf through it and be entertained just for a little while."

The bare fact of the matter is that *Midnight Movie Madness* has one hundred film clips varying between about a minute and twelve seconds, with the average being about twenty-five seconds. Add in the time it takes to read the trivia, play the game, and listen to the Spirit, and there's certainly a fair amount of material to get through. Its repeatability will certainly vary with your individual interest in the genre.

On the humor side, it was most important that the humor be completely unrelated to computers. Howard is scathing about computer humor, "Anything that's quote unquote funny was written by a programmer, and how many times do you sit in front of the computer and laugh at computer references. It's just not funny." Goldberg is slightly mollifying, "One thing we tried to do from the humor aspect of it, we didn't try to come in to make a humor project that would just appeal to people who use computers." He then adds, "We want to position ourselves early on as the first people to really get a good handle on the combination of something that's software with entertainment. Something that's actually funny, not just nerdy, geeky funny."

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MicroTimes

is a 100% Renewable, Recyclable Resource

NEWSPRINT CAN BE RECYCLED 3 TO 4 TIMES

1 ton of recycled paper can:

- Save 17 trees
- 24,000 gallons of water*

Here are just a few recycling stations in major areas:

SOUTH BAY			
San Jose	Recycling Specialists	1720 Old Bayshore Hwy.	(408) 437-7553
Los Gatos	Los Gatos Recycling	41 Miles Ave.	(408) 354-6809
Stanford	Stanford Recycling	205 Tressider Union	(415) 723-0919
Mountain View	Foothill Disposal	1935 Terra Bella Ave.	(415) 967-3034
PENINSULA/MARIN COUNTY			
San Mateo	Elks Club	229 West 20th Ave.	(415) 345-4886
Marin	Marin Recycling	535 Jacoby St.	(415) 453-1404
EAST BAY			
Berkeley	Berkeley Recycling Ctr.	2nd and Gilman	(415) 524-5355
Oakland	Community Recycling	3550 Adeline	(415) 653-2104
San Leandro	Resource Recovery	2615 Davis St.	(415) 638-2303
Hayward	Action Recycling	727 Industrial Pkwy	(415) 537-6075
Danville	San Ramon High School	140 Love Ln.	(415) 837-0533
Walnut Creek	Buyback Pacific Rim	1400 Kazebeer Ln.	(415) 372-8524
SAN FRANCISCO			
San Francisco	Haight-Ashbury Recycle	Frederick and Arguello	(415) 753-0932
San Francisco	Community @ Safeway	Market and Dolores	(415) 285-0669
South SF	Royal Salvage	180 Oyster Point Blvd.	(415) 589-5511

For more information or for recycling centers near you, contact:

California Recycling Hotline 1-800-553-2962

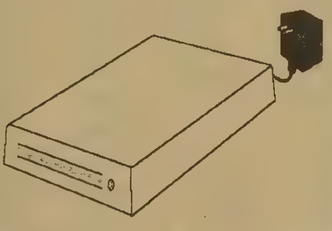
*Source: California Solid Waste Management Board

No turkeys here... just great gift shopping from HSC!

Happy Thanksgiving from all of us at HSC! We are also giving our thanks to you, our loyal customers. Without you, we would not be celebrating our thirtieth year in Silicon Valley!

Packet Modem Project for Ambitious Hams

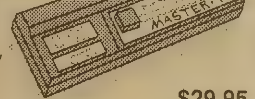
Are you an Amateur Radio Operator? Are you handy with a soldering iron? Are you interested in saving a few bucks? Most of those who answer "yes" to the first question would automatically answer "yes" to the next two! Here is your chance to enter the growing hobby of Packet Radio and do something dear to every Ham's heart...modify a piece of gear! We provide a telephone-type modem and a handful of parts, and a deatailed instruction manual. You get to perform the necesary surgery to come up with a 1200 Baud Packet Radio Modem compatible with the Baycom public domain communications software (available on many BBS's). We do not have this software for distribution yet, but we will try to round this up by the time you see this. If we get it, we will include it with the modem kit. Modification time is about an hour and a half, and set-up and test is about a half hour. Perfect rainy-day project for Hams with an itchy soldering iron!



HSC# 80139 **$39.95**

Chernobyl Fallout?

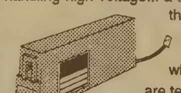
What else could it be when the Russians gear up to build many thousands of these personal radiation dosimeters? They were obviously meant for mass-consumption, as they are blister-packed on a hanger card! It is also telling that some of the packs have instructions in Finnish and Swedish! These pocket-sized (5" x 1.75" x .75") units are frankly not as high in build quality as the Soviet microscopes we were selling a year ago, but they do seem to count gamma radiation exposure from .01 to 9.99 micro-Siewerts per hour (One micro-Siewert = 100 micro-Roentgens). According to the instructions, the maximum admissable safe radiation level is .1 to .6 µSv/h. The instrument uses four commonly available button cells (Russian ones included) that are supposedly good for about 2 years of use four times a day. We opened one of the units up and were interested to find Russian IC's inside...Hmm, do they have a Silicon Valley in Russia?



HSC# 80123 **$29.95**

Laser for the Timid

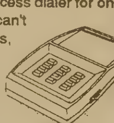
Finally, a Helium-Neon (red) laser for those who are shy about handling high voltage... a self-contained tube/power supply unit that runs off low voltage! Just give it 900 mA of 12VDC and you get 1mW out! Plastic case is 6.25" x 1.25" x 2.25" with 2" power lead. Probably pulls but all are tested good. Great beam quality!



HSC# 14475 **$69.95**

One-trick Phone Friend

This little novelty was meant as an easy-access dialer for one of the off-brand long distance services. You can't change the pre-programmed access codes, but it will remember the last number you dialed with it, so you could use it as a one-number (16-digits) memory re-dialer. Handy for those midnight overseas calls! Uses three button cells which might need replacing.



HSC# 14438 **$4.95**

Board Level Bargains!

Special deals on Everex computer related PC board assemblies:

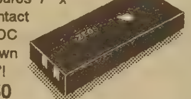
1) 2400 Baud Modem (RS-232 external type) 3.25" x 6", no enclosure avail. Hayes compat., new, fully assembled PC Board, requires 8-12VDC power adaptor. HSC# 14467 $8.95

2) 4800 Baud FAX/Modem Board (RS-232 external type), 9.5" x 6.25", no enclosure avail. Hayes compat., new, fully assembled PC Board, needs 12VAC, software included. HSC# 14505 $14.95

3) 9600 Baud FAX/Modem Board, same details as #2 above but 9600 Baud. HSC# 14506 $19.95

Battery Monolith

These new-in-box rechargable Ni-Cd battery packs appear to be used in Zeos lap-top computers. Zeos Part No. 320-0008-00, 12 VDC 1700mAh, measures 7" x 2.75" x .75" and has .375" square contact pads. Use it to power your 12VDC projects, or turn it over and film your own version of "2001: a Space Odyssey"!

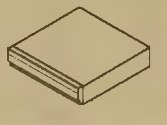


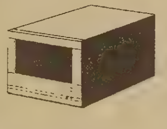
HSC# 14454 **$12.50**

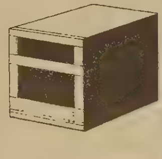
Let HSC be your SCSI Hardware Headquarters!

All drive enclosures feature fan-cooled power supplies, SCSI address switches and ICN50 connector knockouts. Styles A&B include ribbon cable, the others do not. Inquire about our selection of SCSI cables when ordering.

A.	SKHD1	55W P.S.,	Room for single internal drive, fits under a Mac!	10" x 10" x 2.25"	$99.95
B.	SKHD1/Open	55W P.S.,	Same as above, but with 5.25" front opening	10" x 10" x 2.25"	$99.95
C.	SLHD2	60W P.S.,	Front opening for two half-height drives.	7.5" x 12" x 6.5"	$119.95
D.	SLHD3	60W P.S.,	Front openings for three half height drives	7.5" x 12 x 9"	$139.95

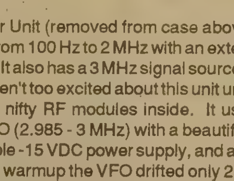






Neat Box you can have three ways!

This is the type of deal we love to offer our customers, because it has so much potential. We bought these items for the neat case, but then discovered that the unit inside has a wealth of possibilities. We offer some suggestions, let your imaginations run wild!



Option #1 -- Weathertight Equipment Case will accept a 19" standard rack-mount unit up to 5" high (with standard 5.25" front panel) and 11" deep. Gasketed front cover has cable storage clips, case has storage slot for .5" thick manual above unit. Outside dimensions are 20" x 7" x 15" deep, exclusive of rubber feet, four sturdy latches and spring-loaded carry handle. Weight 11 lbs. Constructed of aluminum, Navy grey color. Perfect for ham gear (field day!), instrumentation, or other projects requiring rugged, weathertight Mil-spec. case.

HSC# 14032 **$29.95**

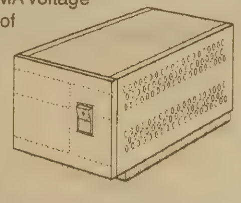
Option #2 -- Frequency Converter Unit (removed from case above) Mod. CV-2353/U was used to mix external signals from 100 Hz to 2 MHz with an external oscillator signal for output to a spectrum analyzer. It also has a 3 MHz signal source that may be applied to the spectrum analyzer. We weren't too excited about this unit until we noted the high quality of construction of several nifty RF modules inside. It uses 115 VAC, has a balanced mixer, a ultra-stable VFO (2.985 - 3 MHz) with a beautifully clean sine-wave output, 600Ω step attenuator, stable -15 VDC power supply, and a 2.5 MHz IF amplifier module. We tested one, and after warmup the VFO drifted only 25 Hz! You could add a crystal oscillator and use the balanced mixer for a QRP Transmitter, or add a detector and modify the VFO for the desired band and have a HF receiver, use as a stable signal generator for HF, or you could add frequency multiplier stages for a stable VHF RF source, etc. Includes power cable, three BNC cables, manual w/ schematic. Unused!

HSC# 14033 **$19.95**

Option #3 -- Buy both units above, only **$44.95**! What a deal!

Is your computer only half-protected?

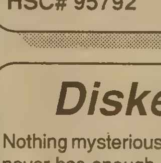
If you are only using an AC power spike/noise suppressor, your computer is *still* vulnerable to power line sags and surges! The typical spike suppressor will not do a thing when your line voltage sags to less than 100 Volts AC or surges to 130...and that can be deadly to your equipment. These SOLA MCR500 voltage regulators instantaneously regulate line fluctuations of ± 15% to within 3%, and will provide 500VA of sinusoidal output within NEMA voltage specification with an input voltage as low as 65% of nominal! In addition, spikes, noise and other transients are filtered out, and the load is isolated from the power line. These are used units, measuring 17" x 8.5" x 8.5", and weigh 40 pounds. They have four grounded AC outlets, a heavy line cord and circuit breaker protection.



HSC# 95792 **$95.00**

Diskette Storage Devices

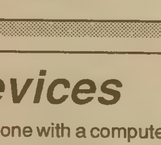
Nothing mysterious or exotic here, just something that anyone with a computer never has enough of...disk storage bins! Choose either the 50-disk capacity 5.25" model or the 40-disk capacity 3.5" unit. Either way, the price will allow you to stock up for future diskette needs.



5.25" Model	HSC# 14499
3.5" Model	HSC# 14500

Your Choice

$3.50



Last Minute Computer Bits

HSC# 14433 Full-size AT-style case with slide cover over the drive fronts, brand new with hardware kit, takes standard AT power supply (not included), room for up to five half-height drives, 16.5" x 6" x 21", nice looking! $19.95

HSC# 14046 Standard XT-style power supply (note, will not fit case above, only for XT desktop cases), 135 Watts, new in box, 90 day warranty $17.50

Halted specialties co. **HSC Electronic Supply**

Toll Free (Orders Only) 1-800-4 HALTED (1-800-442-5833)

Retail Stores:

3500 Ryder St., Santa Clara, CA 95051 (408) 732-1573
4837 Amber Ln., Sacramento, CA 95841 (916) 338-2545
6819 Redwood Dr., Cotati, CA 94931 (707) 792-2277

Terms: Some quantities limited; all items subject to prior sale. **Minimum order: $10.00 plus shipping.** Orders under $20.00 subject to $2.00 handling fee, in addition to shipping. All orders shipped FOB Santa Clara, CA (this means you pay freight!) by UPS Surface (no P.O. Boxes) unless otherwise specified, in which case prevailing carrier rate plus $5.00 handling fee applies. Prepaid orders that don't include shipping charges will be shipped freight COD. There is a $4.00 UPS charge added to shipping charges for COD shipments. If you have questions about your order, please call Customer Service at (408) 732-1854 M-F 9AM to 5PM PST.

HI-TECH USA

(408) 262-8688 Milpitas
(415) 508-8688 San Carlos

SYSTEM	M/B + CPU	* BASIC SYSTEM	BASIC SYS +40MB HDD + 14" MONO & MGP CARD	BASIC SYS + 80MB HDD + VGA CARD & MONITOR	BASIC SYS +80MB HDD + SVGA CARD & MONITOR	BASIC SYS +120MB HDD + SVGA CARD & MONITOR	BASIC SYS W/4MB RAM 1.2 & 1.44 FDD +120MB HDD +SVGA CARD & MONITOR	BASIC SYS W/4MB RAM 1.2 & 1.44 FDD +170MB HDD +SVGA CARD & MONITOR	BASIC SYS W/4MB RAM 1.2 & 1.44 FDD +200MB HDD +SVGA CARD & MONITOR	BASIC SYS W/4MB RAM 1.2 & 1.44 FDD +250MB HDD +SVGA CARD & MONITOR	BASIC SYS W/4MB RAM 1.2 & 1.44 FDD +340MB HDD +SVGA CARD & MONITOR	BASIC SYS W/4MB RAM 1.2 & 1.44 FDD +540MB HDD +SVGA CARD & MONITOR
486DX2-66/256C PCI	$728	$874	$1,064	$1,210	$1,234	$1,244	$1,404	$1,434	$1,454	$1,474	$1,534	$1,734
486DX-50/256C PCI	688	834	1,024	1,170	1,194	1,204	1,364	1,394	1,414	1,434	1,494	1,694
486DX-33/256C PCI	544	684	874	1,020	1,044	1,054	1,214	1,244	1,264	1,284	1,344	1,544
486DX2-66/256C ORCHID VLB	598	758	948	1,094	1,118	1,128	1,288	1,318	1,338	1,358	1,418	1,618
486DX-50/256C ORCHID VLB	558	718	908	1,054	1,078	1,088	1,248	1,278	1,298	1,318	1,378	1,578
486DX-33/256C ORCHID VLB	418	578	768	914	938	948	1,108	1,138	1,158	1,178	1,238	1,438
486SLC2-66/64C IBM VLB	258	408	598	744	768	778	938	968	988	1,008	1,068	1,268
486SLC2-50/64C IBM VLB	208	358	548	694	718	728	888	918	938	958	1,018	1,218
486DX2-66/128C VLB	528	678	868	1,014	1,038	1,048	1,208	1,238	1,258	1,278	1,338	1,538
486DX-50/128C VLB	488	638	828	974	998	1,008	1,168	1,198	1,218	1,238	1,298	1,498
486DX-40/128C VLB	324	474	664	810	834	844	1,004	1,034	1,054	1,074	1,134	1,334
486DX-33/128C VLB	342	492	682	828	852	862	1,022	1,052	1,072	1,092	1,152	1,352
486DX2-66/128C EISA	574	724	914	1,060	1,084	1,094	1,254	1,284	1,304	1,324	1,384	1,584
486DX2-50/128C EISA	528	678	868	1,014	1,038	1,048	1,208	1,238	1,258	1,278	1,338	1,538
486DX-33/128C EISA	386	538	728	874	898	908	1,068	1,098	1,118	1,138	1,198	1,398
486SLC2-50C IBM ISA	178	328	518	664	688	698	858	888	908	928	988	1,188
486DX2-66C ISA	498	648	838	984	1,008	1,018	1,178	1,208	1,228	1,248	1,308	1,508
486DX-50/128C ISA	474	624	814	960	984	994	1,154	1,184	1,204	1,224	1,284	1,484
486DX2-50C ISA	368	528	718	864	888	898	1,058	1,088	1,108	1,128	1,188	1,388
486DX-40/128C ISA	328	478	668	814	838	848	1,008	1,038	1,058	1,078	1,138	1,338
486DX-33C ISA	318	468	658	804	828	838	998	1,028	1,048	1,068	1,128	1,328
486SX-33C ISA	164	324	514	660	684	694	854	884	904	924	984	1,184
486SX-25C ISA	130	280	470	616	640	650	810	840	860	880	940	1,140
486DLC-40/64C ISA	134	284	474	620	644	654	814	844	864	884	944	1,144
486DLC-33/64C ISA	120	270	460	606	630	640	800	830	850	870	930	1,130
386DX-40/64C	96	246	436	582	606	616	776	806	826	846	906	1,106
386SX-40	72	232	422	568	592	602	762	792	812	832	892	1,092
386SX-33	64	224	414	560	584	594	754	784	804	824	884	1,084

*** BASIC SYSTEM CONFIGURATION:** Motherboard & CPU, 1MB memory installed, 1:1 2HD/2FD controller with 2S/1P/1G, 1.2MB or 1.44MB Floppy Drive, Internal Clock/Calendar, Enhance Case with Power Supply, and 101-Key Enhanced Keyboard.

Happy Holiday Super Sale!

DELUXE SYSTEMS

386SX-33	$778
386SX-40	788
386DX-40/64K	798
486SX-25/128K	878
486SX-33/128K	908
486DLC-33/64K	828
486DLC-40/64K	838
486DX-33/128K	1,028
486DX-40/128K	1,008
486DX2-50/128K	1,098
486DX-50/128K	1,168
486DX2-66/128K	1,208
486 DX-33/128K EISA	1,098
486DX-50/128K EISA	1,248
486DX2-66/128K EISA	1,298
486SLC2-50/64K VLB	908
486SLC2-66/64K VLB	948
486DX-33/128K VLB	1,038
486DX-50/128K VLB	1,178
486DX2-66/128K VLB	1,218
486DX-33/256K PCI	1,258
486DX-50/256K PCI	1,398
486DX-66/256K PCI	1,458
586 Pentium VLB	2,448

SYSTEM CONFIGURATION

- Motherboard w/CPU
- 4MB RAM 70NS
- 120MB Fast Hard Drive
- 1.2MB and 1.44MB Floppy Drive
- IDE 2HD/2FD Controller w/2S/1P/1G
- 512KB SVGA Card
- 14" SVGA .28 Color Monitor
- 101-Key Enhanced Keyboard
- Enhanced Case w/Power Supply
- Microsoft Compatible Mouse w/Pad

OPTIONS

170MB Hard Drive	Add $35
200MB Hard Drive	Add $50
250MB Hard Drive	Add $65
340MB Hard Drive	Add $120
540MB Hard Drive	Add $320
14" Non-Interlaced Monitor	Add $20
15" Non-Interlaced Monitor	Add $120
VLB IDE Controller	Add $20
PCI Bus VGA Card w/1MB	Add $170
16BIT SVGA Card w/1MB	Add $20
Window Accelerator w/1MB	Add $30
Orchid Fahrenheit 1280	Add $110
Diamond S.S. Pro VLB w/1MB	Add $70
Orchid Fahrenheit VLB w/1MB	Add $120
250MB Tape Back-up	Add $130
16BIT Ethernet Card	Add $50
Deluxe Speakers	Add $10
Sony or Mitsumi CD-ROM	Add $150
Sound Blaster Pro Deluxe	Add $110

VESA DELUXE SYSTEMS

ORCHID VLB SYSTEMS

486DX-33/256K	$1,528
486DX-50/256K	1,678
486DX2-66/256K	1,708

SYSTEM CONFIGURATION

- Orchid VLB Motherboard
- Orchid Fahrenheit VLB w/1MB
- VLB IDE Controller w/2S/1P/1G
- 4MB High Speed RAM
- 250MB Fast Hard Drive
- 1.2MB Floppy Drive
- 1.44MB Floppy Drive
- 15" Non-Interlaced Monitor
- Focus 9000 Keyboard
- Medium Tower Case w/PS

OPTIONS

340MB Hard Drive	Add $60
540MB Hard Drive	Add $260
17" Non-Interlaced Monitor	Add $270
Sound Blaster Pro Deluxe	Add $110
250MB Tape Back-up	Add $130
Sony or Mitsumi CD-ROM	Add $150
Creative Labs Discovery 16 Upgrade Kit	Add $410

BEST BUY NOTEBOOKS

- 4MB RAM
- 120MB HARD DRIVE
- 1.44 FLOPPY DRIVE
- 1S / 1P
- BUILT-IN TRACKBALL
- BATTERY PACK
- CARRYING CASE

Super Sales	Mono	Dual Scan Color	Active Matrix Color
486SX-25	$1,428	$2,078	$2,798
486SX-33	1,468	2,128	2,848
486DX-33	1,598	2,278	2,998
486DX2-50	1,658	2,328	3,048
486DX2-66	1,788	2,478	3,198

UPGRADES

MS DOS 6.0	Add $50
8MB RAM	Add $280
20MB RAM	Add $1,600
200MB Hard Drive	Add $130
340MB Hard Drive	Add $330
Internal Battery Pak	Add $95
Internal Fax Modem	Add $140
Pocket Fax Modem	Add $120
Docking Station	Add $375

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Simply because we deliver the best values.

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HI-TECH USA — SEASONS GREETINGS — LOW PRICES

CASE WITH POWER SUPPLY

Mini Tower Case w/200W Power Supply	$44
Desktop AT Case w/200W Power Supply	46
Medium Tower Case w/230W Power Supply	74
Full Tower Case w/250W Power Supply	94

CD-ROM / MULTIMEDIA

Creative Labs	
Sound Blaster	$58
Sound Blaster Pro	98
Sound Blaster Pro Deluxe	103
Sound Blaster 16 ASP	192
CD ROM Upgrade Kit	328
Discovery CD 16 Upgrade Kit	408
Edutainment CD 8 Upgrade Kit	408
Edutainment CD 16 Upgrade Kit	464
Diamond Sonic Sound Card (SCSI)	228
Mediavision Pro Audio Spectrum 16	134
Orchid Soundware Sound Card (AT)	228
Chinon CDS535 (Int.) SCSI	318
Mitsumi CD-ROM (350MS)	146
NEC CD-ROM 84 (SCSI) Internal	328
SONY CD-ROM 31A	142
TEXEL	
DM3021 (SCSI) Internal	198
DM5021 (SCSI) External	278
DM3028 (SCSI) Internal	348
Toshiba XM-3401B (200ms) SCSI	338
Trantor SCSI Host w/Driver	54
Audio Pak (Sound Card, Speaker, Joystick, Earphone)	58
Deluxe Speakers	10

CD SOFTWARE TITLES

American Business Phone Book-1992	18
Animals v1.0 DOS	16
Annabel's Dreams-Egypt	67
Arthur's Teacher Trouble	22
Atlas Pak v3.1 World/US	20
Battle Chess DOS	16
Beyond the Wall of Stars	20
Beauty & Beast MPC	14
Bring the World to Your Senses	12
Campton's Family Encyclopedia	34
Campton's Encyclopedia MPC	60
Carmen San Diego DOS	20
CD Game Pack II DOS	16
CD Storytime DOS	16
Chess master 3000 MPC	17
CIA World Fact Book DOS	17
Composer Quest MPC	24
Desert Storm MPC/MAC	18
Dictionary of the Living World	25
Dinosaur Adventure	21
Electronics Home Library	18
Family Choice/Britannica DOS	16
Family Doctor DOS/MAC	18
Family Education Collections DOS	18
Great Cities-Vol 1 / Vol 2 DOS	17
Guinness Disk of Records MPC	19
Jets & Props MPC	19
Jones in Fast Lane MPC	15
King's Quest V DOS	15
Kodak Photo CD Access	14
Language of the World	24
Library of Future 1st DOS	44
Loom From Lucas Film DOS	15
Macmillan Dictionary For Children	19
Macromedia Action for Windows	26
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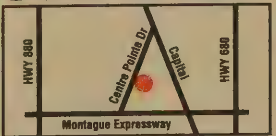

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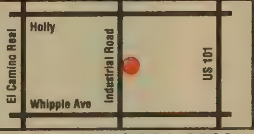

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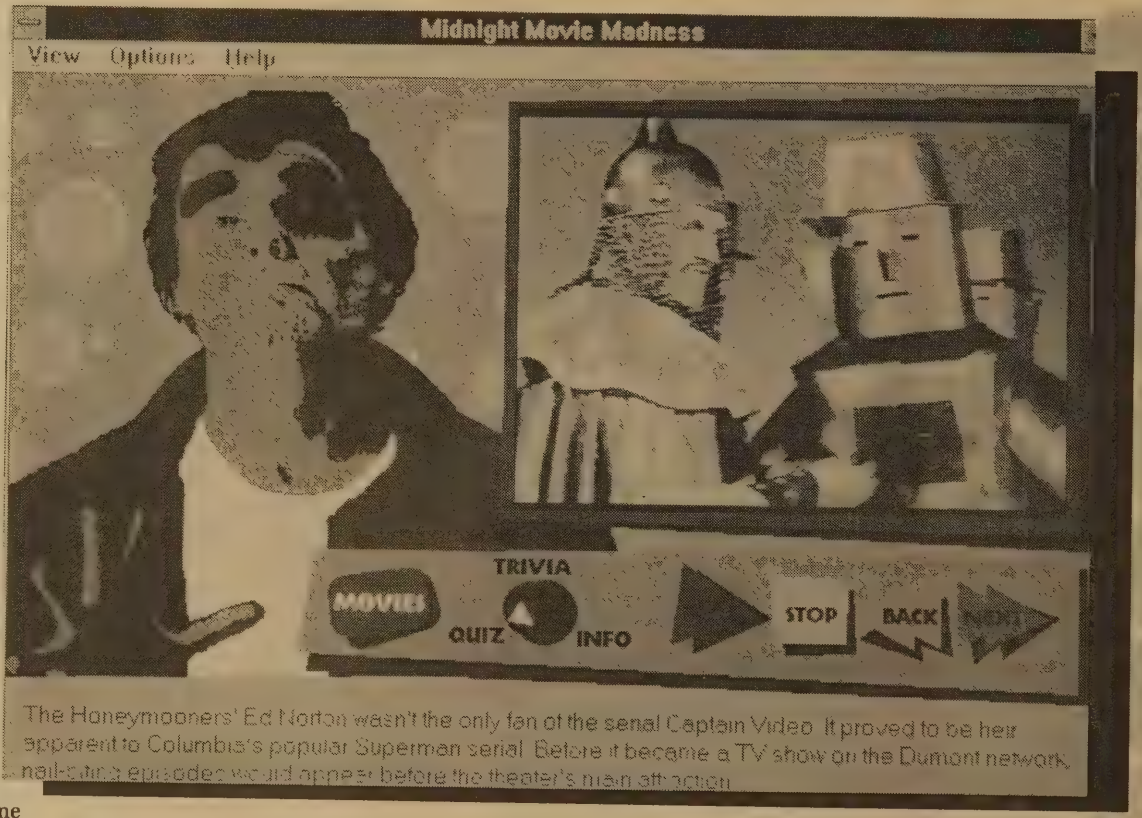
humor could not be kept entirely apart. While SBD concocted *Midnight Movie Madness* and did most of the production, Medio Multimedia provided the money, some technical expertise, and is doing the marketing.

Goldberg explains, "An interesting thing with this project is that obviously the *Lampoon's* humor is very biased towards an adult audience and Medio really wanted to keep a very tight grip on what we used, what kind of jokes we made. They didn't want us making any jokes about certain celebrities. I don't think they understood the parody and satire. They were very nervous about it and also about using anything that might be off-color or even a little bit blue. So what we did was to put two different databases on the disc. One is to install for your child or someone under 13 to play with no references that wouldn't be in a G-rated movie. The other version is more adult. There're no four-letter words, or anything that would even be considered by any normal person as being off-color at all..." Howard dryly interjects, "Just double-entendres, suggestiveness, things like that." Goldberg continues, "That's the other version for an adult to play. The arrangement is one of the great things about multimedia, I think, that you have the freedom to do something like that. Whereas with a TV show either you're going to have to suffer through something that's been cut up by some hack in a network editing studio or you're not going to feel comfortable watching it with your kid. With this you can choose which one you want. Nobody has to suffer."

The differences between the software and entertainment industries also became apparent in the way the game ends when you exit Windows. SBD originally wanted to have a choice of two endings depending on your score. The Spirit would either "bag" you and virtually lock you in the trunk of the car or let you go with a warning admonishment. Medio felt that this was inappropriate, that when you exit Windows, you just exit Windows, you can't have a video clip play, that isn't what Windows does. Greenberg responded, "Of course you can. Why not? Forget what Windows does or doesn't do, that's the way it should end. I think it's important." Glasser felt that this was a matter of "confusing it [Windows] with a tool. It's not a tool, it's an entertainment thing. If it was a tool like a spreadsheet and some video popped up every time you stopped it, you'd get really annoyed. With media you can do different things."

Goldberg continues, "If you keep getting tied down to what everything is supposed to do, it'll never change." Howard's view is that "It's like a television show, and it should have a beginning, a middle and an end." However, the final version simply exits Windows in the standard way.



The Honeymooners' Ed Norton wasn't the only fan of the serial Captain Video. It proved to be heir apparent to Columbia's popular Superman serial. Before it became a TV show on the Dumont network, nail-biting episodes would appear before the theater's main attraction

It was most important that the humor be completely unrelated to computers.

THE TECHNICAL DETAILS

Midnight Movie Madness was written in Visual Basic and uses the database that comes with it. Glasser explains that, "While you need to be a programmer, you don't need to be a real professional programmer, you can be a hobbyist programmer and do VB. It's not that rigorous. Also it fits in well with Windows and the multimedia extensions. The video works really well and it's easy to incorporate. It's easy to incorporate sound. You can also develop it on a very low-end, cheap machine."

The CD-ROM comes with the run-time version of Visual Basic and will run on a 386SX or higher processor. It requires 2MB of hard disk space, a VGA or better display (256-color support is recommended), Windows 3.1 or later, and DOS 3.1 or later. An audio board with speakers or headphones is also recommended along with a mouse or other compatible pointing device.

Medio has two other CD-ROM titles currently available: *Exploring Ancient Architecture* and *JFK Assassination: A Visual Investigation*. Both have the same system requirements. The recommended retail price for each title is $59.95, or all three are available as a bundle, *The Explorer Collection*, for $119. ■

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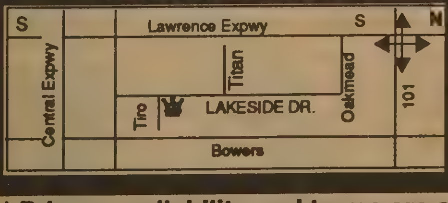

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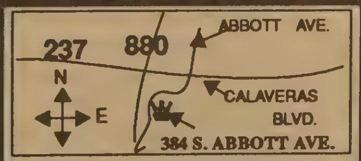

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Manipulating Words With Computers

Text-Based Works Are Reshaping Literature And In The Future Might Replace The Traditional Sequential Book

BY JUDY MALLOY

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Judy Malloy has been making and studying artists' software since 1985. Her work has been shown and published internationally. She is an associate editor of Leonardo *and* Leonardo Electronic News. *Her email address is: Jmalloy@well.sf.ca.us.*

Before multimedia computer platforms were widely available, film and video had already begun to alter visual art—making the single-framed image a disappearing cultural artifact. Writing, however, has lagged behind—confined, for the most part, to the pages of static, sequential books.

Recently writers have begun to explore the manipulation of words made possible with computers—creating new forms such as narrative databases that simulate human memories; hyperfictions that link thoughts, imagery, characters, and plot streams; adventure stories that unfold through reader choices; and visual poetry in which words are animated or are interactively read on the computer screen.

VISUAL POETRY

In addition to an illuminated manuscript quality, the computer platform offers poets who work visually with words the capability of animating words. Poet and playwriter Ron Buck (who hosts the poetry conference on The WELL along with Sarah T. Randolph) uses words and ASCII graphics to create his visually striking and content-laden works. They are "BeYond the B O R D E R S of the n o r m a l TypeSET word," Buck writes in the forward to *The Visual Plow*, a printed collection of his

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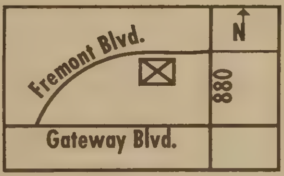


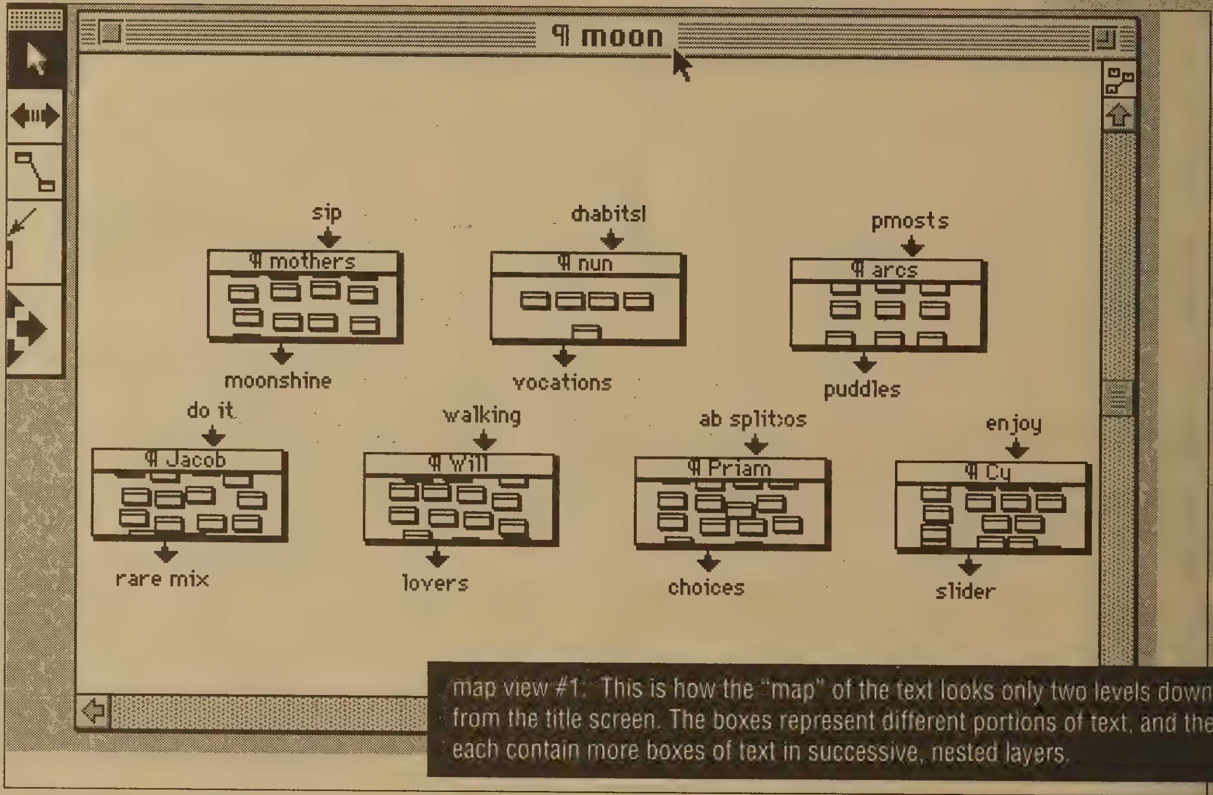
Storyspace lets authors create a distributable reader that enables Macintosh users who do not have this application to read Storyspace works

poetry. His visual poems that appear on the computer monitor are available on The WELL—both on the poetry conference and on the Artcom Electronic Network "datanet" menu.

COLLOQUY: AN AUTHORING TOOL FOR POETS

Colloquy, for MS-DOS computers, is an interactive poetry authoring system codeveloped by Judith Kerman and Robert Chiles. "It's been tried with high school and college students," Kerman says. "Most of them respond to it as a curiosity, I think, but that's true of professional poets, too, unless they are also unusually curious about computers... However, poets who are really interested in new technology are enthusiastic."

Colloquy's "Editor" allows poets to write interactive poems. Readers interact with the text using its "Reader" module so that Colloquy creates poetry that is essentially a dialogue between the author and the reader. "It's really a pretty nice interface and the concept is very powerful from a poet's perspective," Kerman says.



map view #1: This is how the "map" of the text looks only two levels down from the title screen. The boxes represent different portions of text, and they each contain more boxes of text in successive, nested layers.

CREATING WORD WORKS WITH HYPERCARD

HyperCard has been extensively written about (MELVYL, the University of California's online catalog, reports fifty-two book titles with the word HyperCard in them), but it is worth pointing out that besides its graphic and multimedia capabilities, it remains an excellent tool for writers who want to create electronic literature with customized (not necessarily hypertextual) structures and interfaces, but do not want to deal with advanced programming languages.

Text-based HyperCard works are sometimes criticized because they do not use all the capabilities of the application, but this is like criticizing a painting because the artist didn't use all the colors. There is no reason that authors who work with words should feel they have to use HyperCard's graphic capabilities just because they are there. In fact, computer graphics, and in particular animated graphics, can be so seductive that they detract as well as distract from the power of words alone.

The graphic interfaces that HyperCard makes possible can, however, provide effective entry into otherwise largely textual works. For instance, Brian Thomas's *If Monks Had Macs* begins with a graphic of an open book by a monastery window that looks out on a pleasant secluded courtyard. Clicking on the open book leads to a library. Clicking on titles in the library leads to the mainly text "pages" of *If Monks Had Macs*—a work that includes among other things the text of Thomas á Kempis's *The Imitation of Christ.*

"BEYOND CYBERPUNK"

HyperCard lends itself well to extensive compendia of written texts such as The Computer Lab's *Beyond Cyberpunk, A Do-It-Yourself Guide to the Future.* "It walks, it talks, it crawls on its belly like a reptile.... It's a dadabase 'machine for the generation of meaning,'" say its creators (Gareth Branwyn, Peter Sugarman, Mark Frauenfelder, and Ward Parkway).

In this massive and eclectic information portrait of the cyberpunk movement and beyond, you move from graphics and noises to an initial interface of zones. Each zone—Manifestos, Media, CyberCulture, and Street Tech—leads to a table of contents that includes, among many other things, a wonderfully realistic switch that enables you to move between browser mode (see the first page of each article) or pager mode (page through an article).

In the tools section, you can customize your journey through the 5.5MB of mostly text *Beyond Cyberpunk* material by authors who range from science fiction author Bruce Sterling (*Room With a Cyberview*) to information worker Reva Basch (*Life Online*). Questions in the tools section range from "How loud do you like your sounds?" to "How often shall Kata pop up?" (Kata is a sort of "agent" whose appearances are unpredictable. If you don't like her, the question "How often shall Kata pop up?" can be answered with Rarely instead of Often.)

Among the articles available in Beyond Cyberpunk are "The Radio Days of Cyberspace" by Gareth Branwyn ("I am a

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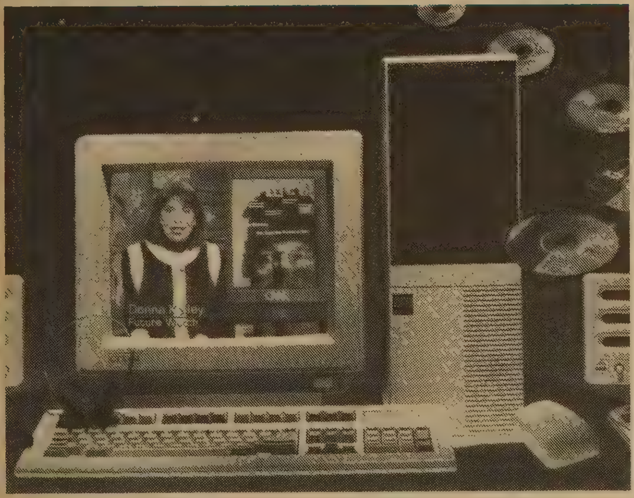

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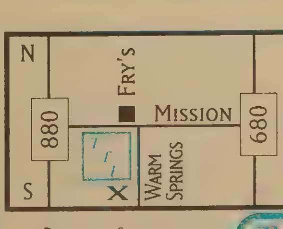

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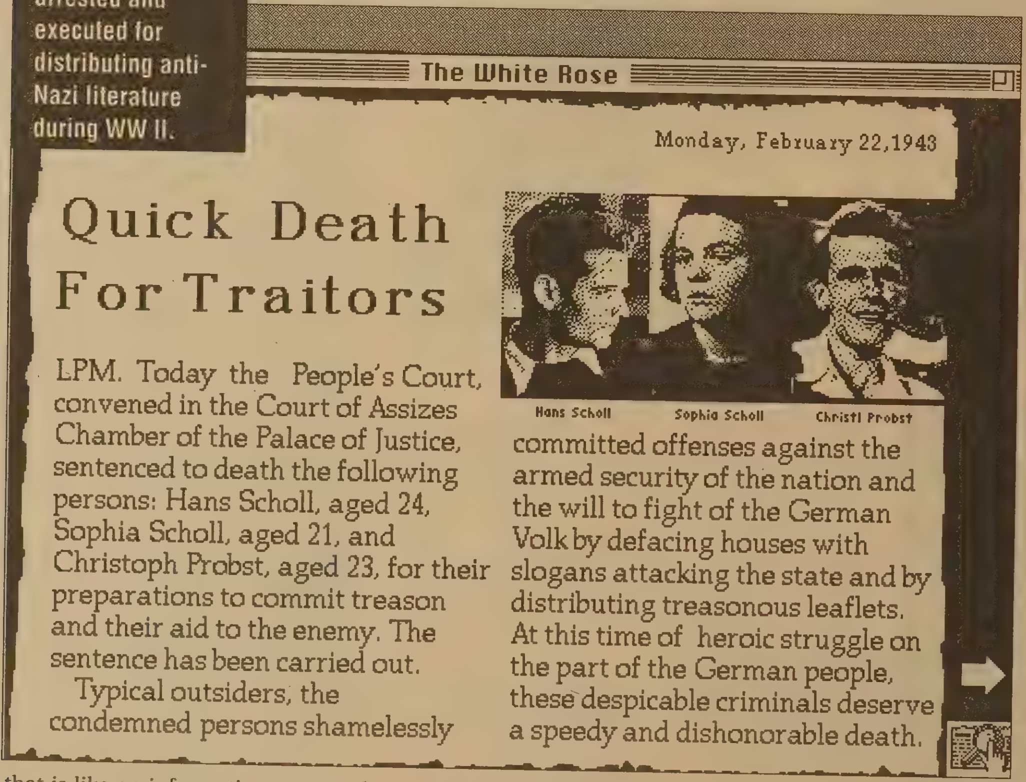
strange loop, my computer, my mouse, and me."), "Cyberpunk Gaming" by Steve Jackson, and "Networking: The Decentralized Assault" by The Aggressive School of Cultural Workers—Iowa Chapter. You can also follow links (such as GURPS cyberpunk) or "go shopping."

THE WHITE ROSE

Hyperfiction and nonfiction hypertext works have the capability to make the uncovering of small pieces of information (that might be easily found in a sequential book) an experience that is like an information treasure hunt. The sense of discovery that this enables can enhance the material by giving the reader the feeling of having stumbled into a private life. *The White Rose*, another HyperCard work by Brian Thomas, is a collection of documents concerning a group of German students who were arrested and executed for printing and distributing anti-Nazi literature during World War II. Caught by the picture of her clear, innocent face in the file drawer section of *The White Rose*, I followed Sophia Scholl's story.



Monday, February 22,1943

Quick Death For Traitors

LPM. Today the People's Court, convened in the Court of Assizes Chamber of the Palace of Justice, sentenced to death the following persons: Hans Scholl, aged 24, Sophia Scholl, aged 21, and Christoph Probst, aged 23, for their preparations to commit treason and their aid to the enemy. The sentence has been carried out.

Typical outsiders, the condemned persons shamelessly committed offenses against the armed security of the nation and the will to fight of the German Volk by defacing houses with slogans attacking the state and by distributing treasonous leaflets. At this time of heroic struggle on the part of the German people, these despicable criminals deserve a speedy and dishonorable death.

***The White Rose* HyperCard stack tells the story of a group of German students who were arrested and executed for distributing anti-Nazi literature during WW II.**

"I have before me your picture, Sophie," her cell mate Else Gel recalls, "earnest, questioning, standing alongside your brother and Christoph Probst. It is as if you suspected what a heavy destiny you were to fulfill, which was to unite the three of you in death." Sophie's story is moving and compelling. Her calmness before the execution (she was beheaded) contrasts with her alive and thoughtful presence in the letters included in *The White Rose:*

"Dear Lisa I've just been playing the *Trout* Quintet on the phonograph. Listening to the andantino makes me want to be a trout myself. You can't help rejoicing and laughing, however moved or sad at heart you feel, when you see the springtime clouds in the sky and the budding branches sway, stirred by the wind, in the bright young sunlight. I'm so much looking forward to the spring again. In that piece of Schubert's you can positively feel and smell the breezes and scents and hear the birds and whole of creation cry out for joy. And when the piano repeats the theme like cool, clear sparkling water—oh, it's sheer enchantment.

Let me hear from you soon.

Lot's of love,

Sophie"

MORE ABOUT HYPERCARD

Its ubiquitous presence on Macintosh machines makes HyperCard an excellent choice for writers who want to distribute their work. However, HyperCard authors do need to start with a clear idea of the kind of structure and interface they wish to create, and HyperCard works better for those with some programming experience. It does not have an overall mapping application. In addition, it is easy for writers to get sidetracked into graphics, animation, and sound.

WRITING HYPERTEXT WITH STORYSPACE

Storyspace facilitates an organic, natural hypertextual writing while at the same time it gives writers the capability of tightly structuring (and restructuring) their hypertexts—without wrestling simultaneously with programming or scripting languages. Links, easily created, connect "writing spaces" to another. Links can also be used to make multiple paths or notes. Structures can be viewed as they progress—in map, chart, or outline form.

As I tested this application, I found myself writing a story in which the words and structure were radically different from the narrabases I usually create. Words flowed in a way writing doesn't usually do for me, and, atypically, because I usually prefer to begin writing with pen and paper, I was always anxious to get back to the computer to continue writing.

In the end, because it works better for me, I returned to my own narrabase form; but I enjoyed writing hyperfiction with Storyspace and found it an experience related to the painter's process of gradually applying paint to various portions of a canvas until it eventually coheres into a whole.

QUIBBLING

Some works of hyperfiction that have been written in Storyspace are Michael Joyce's *afternoon*, Stuart Moulthrop's *Victory Garden*, and Carolyn Guyer's *Quibbling*. Guyer deftly intertwines the stories of what appear to be four different women in this

continued on page 316

RESOURCES:

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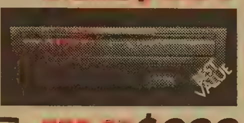

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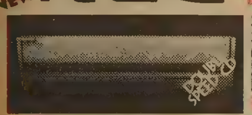

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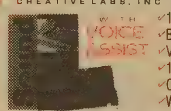

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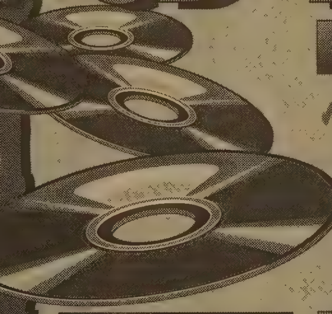

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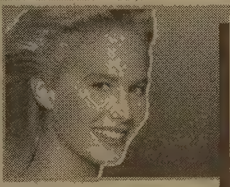

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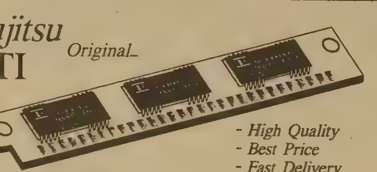

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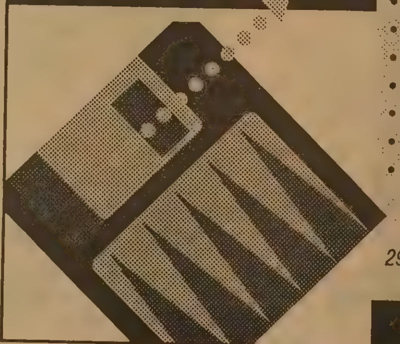

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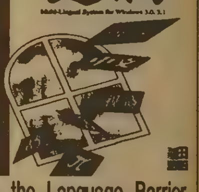

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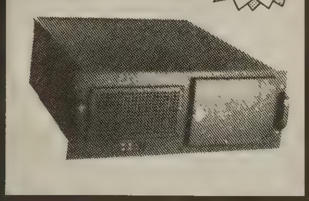

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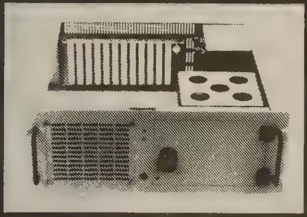

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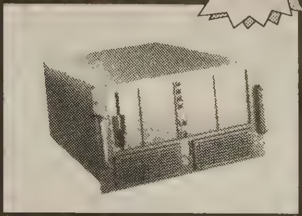

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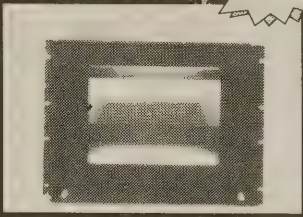

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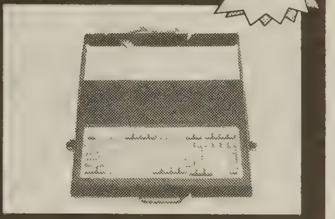

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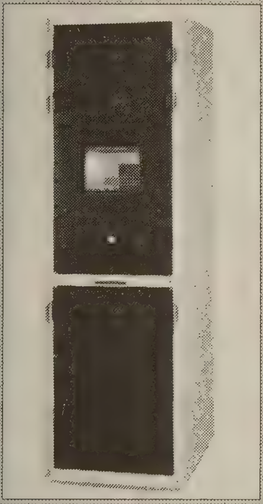

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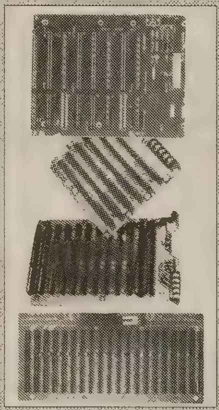

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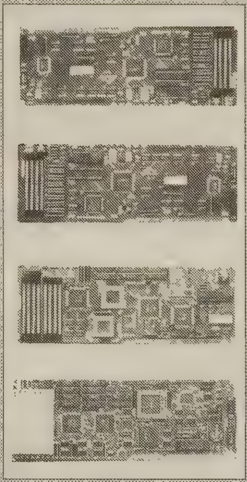

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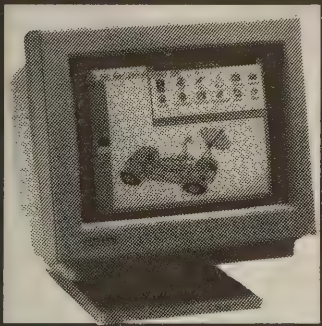
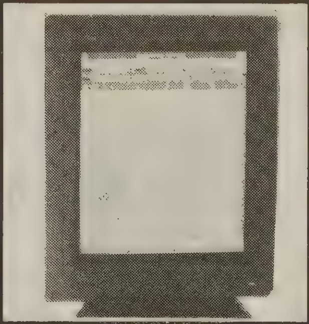


14" SVGA COLOR MONITOR

- CRT 14" DIAGONAL NON-GLARE FLAT
- DOT: .28mm
- RES: 1024 X 768 NON-INTERLACE, 800 X 600, 720 X 400, 640 X 480, 640 X 350
- POWER SUPPLY: 120-240V AUTO SELECTION



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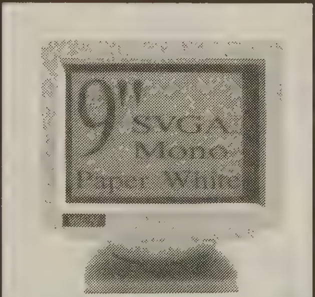
- RES: 640x872 FULL PAGE
- POWER SUPPLY: 96 to 250V

15" PAPER WHITE VGA MONITOR

- CRT: 15" DIAGONAL, NON-GLARE FLAT PAPER WHITE
- RES: 640 x 600, 640 x 550, 640 x 350, 720 x 400, 640 x 480
- POWER SUPPLY: 120V



9" SVGA MONITOR MONO PAPER WHITE

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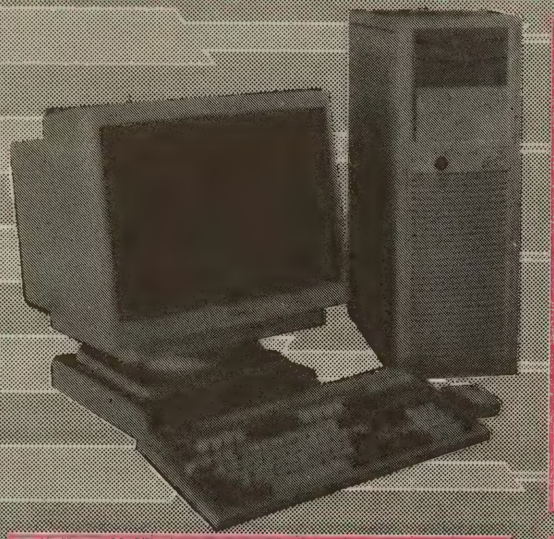

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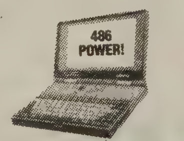

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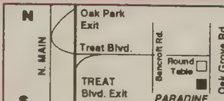

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Orchid P9000	VLB 32-Bit	3MB	$395
Diamond Stealth/24	VLB 32-Bit	1MB	$165
Diamond Speedstar/Pro	ISA 16-Bit	1MB	$139
Diamond Viper	VLB 32-Bit	2.5MB	$395
Number Nine GXe Level 11	VLB 32-Bit	2MB	$359
Standard Tech CL	ISA 16-Bit	1MB	$85
ATI Ultra Pro VLB	VLB 32-Bit	1MB	$279
ATI Ultra Pro VLB	VLB 32-Bit	2MB	$339

SCSI CONTROLLER CARDS

Adaptec	1542C	16-Bit ISA	$259
Ultrastor	34F	32-Bit VESA LB	$259
Bus Logic		32-Bit VESA Local Bus	$259
DTC	3270VL	SCSI 32-Bit VLB	$129
DTC	2270VL	IDE 32-Bit VLB w/2S/1P/1G I/O	$65

MOTHERBOARDS/CPU/MEMORY

Micronics EISA-VESA LB w/256K 486DX-33/dx2-66....$850/1,095

Micronics MX-30 VESA LB w/256K 486DX-33/DX2-66...$595/845

Micronics JX-30 VESA LB w/256K 486DX-33/DX2-66 ....$695/945

NICE Made USA VLB 256K 486DX-33/DX2-66 ....$465/675

INTEL 486DX-33 CPU........$290 INTEL 486DX2-66CPU.......$495

1x9 (3 Chip) 70ns Simms....$45 4x9 (9Chip) 70ns Simms $CALL

1x36 70ns 4MB Simms...$CALL 4x3670ns 16MB Simms..$CALL

MODEMS

US Robotics Sportster 14400/14400 Modem w/Group III Fax

Internal:	$179
External:	$195
Zoltrix 9600/2400 Send Fax Int Modem	$49
Zoltrix 9600/2400 Send/Receive Int Modem	$65

SYQUEST

SQ555	44MB	20ms	SCSI	Int	$285
SQ5110	88MB	20ms	SCSI	Int	$315
SQ5110C	88/44MB	20ms	SCSI	Int	$399
SQ3105S	105MB	20ms	SCSI	Int	$565
SQ3105A	105MB	20ms	IDE	Int	$545

TAPE BACK-UP

Colorado	DJ10	120	$195
Colorado	DJ20	250	$195
Conner	C250MQ	250 NEW!	$169

MULTI-MEDIA

CD-ROM DRIVES

Toshiba XMS3401BTA	200ms	330KB/sc	SCSI	$395
NEC CDR-84	285ms	300KB/sc	SCSI	$475
Texel 3024	265ms	300KB/sc	SCSI	$355
Mitsumi	380ms	150KB/sc	AT-BUS	$195
Panasonic CR-523-B	390ms	150KB/sc	AT-BUS	$195
Panasonic CR-552-B	320ms	300KB/sc	AT-BUS	$239

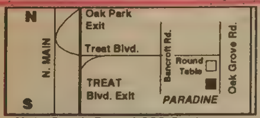
SOUND CARDS

Sound Blaster Pro Deluxe	$125
Sound Blaster Pro 16 Basic	$145
Sound Blaster Pro 16 Deluxe ASP	$229
Pro Audio Spectrum 16	$149
Pro Audio Studio 16	$209

MULTI MEDIA KIT

Sound Blaster Pro Deluxe Sound Card w/Panasonic 562-B 300KB/Sec Dual Speed CD-Rom Drive, Amplified Computer Speakers, All Cables and drivers, and Five CD-ROM Titles Including: Software Toolworks Encyclopedia, Mavis Beacon Teaches Typing, Chess Master 3000, World Atlas V3.2, & US Atlas V3.1.

$395



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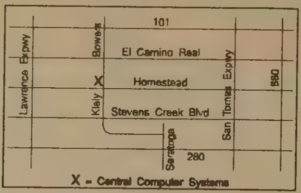

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- Financing plan available OAC
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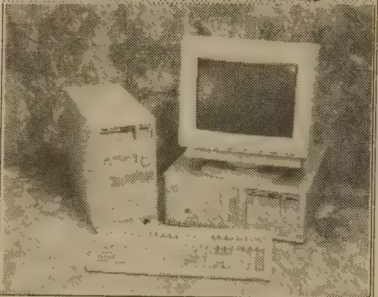

ORCHID
(CAD STATION)

ORCHID

Super Board
4 MB, TEAC 1.2 FD
Maxtor 130 MB HD, IDE Controller, 2S 1P
Mid Tower Case w. 220W
Mitsumi 101 Keyboard
EMC 1430 monitor 14" 1024x768 .28 NI
Fahrenheit VLB 1MB VGA
MS Serial Mouse, MS DOS 6.0 & WIN 3.1

VLB 486-33, 256K cache	1715
VLB 486-50, 256K cache	1850
VLB 486-DX2-66, 256K cache	1940

MICRONICS
COMPUTERS INC.

4 MB, TEAC 1.2 FD
IDE Controller, 2S 1P
Baby AT Case w/ 200W
Mitsumi 101 Keyboard
MS Serial Mouse
MS DOS 6.0 & Windows 3.1

486-DX2-66 ISA 256K cache VLB	1415
486-33 ISA 256K cache VLB	1195
486-33 ISA 256K cache MiniBoard	1185
486-50 ISA 256K cahce MiniBoard	1295
486-DX2-66 ISA 256K cache MiniBoard	1415

NICE
(MADE IN U.S.A)

4 MB, TEAC 1.2 MB FD
IDE Controller, 2S 1P
Baby AT Case w. 200W
Mitsumi 101 Keyboard
MS DOS 6.0 & WIN 3.1
MS Serial Mouse

486-DX2-66 EISA 256K VLB	1499
486-50 EISA 256K cache VLB	1425
486-33 ISA VLB 256K cache	1075
486-DX2-66 Mini EISA 256K cache VLB	1345

II HARDWARE

1. CD ROM

Sony CD Caddy	6.95
Altec ACS50 Speaker System	69
Jazz Hipster J-511AV Active Speakers	75
Labtec Speakers CS150/ CS180/ CS550.	25/29/32
Koss Maximum DR Amplified Speakers	69
Koss Amplified Mini Speakers w. Equalizer	45
Cardinal Digital Sound Pro 16	125
Gallant Sound Card / Gravis UltraSound	69/139
Turtle Beach 16 bit MultiSound	(499)515
CREATIVE LAB	
CD-ROM Upgrade Kit w. 4 CD Int	375
CD 531 Ext w. Ext Kit	239
Discovery CD-16 Int	469
Edutainment CD-16 Int Kit	479
Sound Blaster Pro Multimedia Kit w. 6 CD Ext	459
Sound Blaster Deluxe	85
Sound Blaster Pro Basic / Deluxe	99/119
Sound Blaster 16	189
Sound Blaster 16 SCSI ASP	219
Video Blaster / Video Spigot for Win	315/345
Voice Blaster / Wave Blaster	75/224
Midi Kit	59
LOGITECH	
Soundman 16	125
MEDIA VISION	
Fusion Double CD 16	579
Multimedia Upgrade Kit (w. Spectrum 16)	679
Midi Mate / w. Passport Design Trax	49/89
Pro 16 Multimedia System II Int	849
Pro Audio Spectrum 16 / Studio 16	155/199
Pro Movie Spectrum / Studio	285/335
NEC	
CDR-74 280ms, 300KB/s, Ext	445
CDR-84 280ms, 300KB/s, Int	399
Interface Kit for PC	79
Multimedia Upgrade Kit Int / Ext	795/855
ORCHESTRATOR	
SoundPerfect 16 + Sony 31A + 6 CD	389
SoundPerfect 16 + Toshiba 3401B + 6 CD	619
PANASONIC	
562 320ms, 300Kb/s Int / w. controller	199/219
TEXEL (w. controller	**add $49)**
DM-3028 280ms, Internal	329
DM-5028 280ms, External	419
Driver kit for Media Vision Int / Ext	29/69
TOSHIBA (w. controller	**add $49)**
3401B 200ms 330KB/s Int	349
3401E 200ms Ext / w. Toshiba Case	429/499
Driver kit for Media Vision Int / Ext	29/69
TRANTOR	
Mini SCSI Plus (Parallel to SCSI Adapter)	189
Music Box v.2	29
T130 SCSI Interface Kit (w/o cable)	49

CD SOFTWARE Titles - See Sec. III

2. CASES

Baby AT w. 200W Power	69
Baby Tower w. 200W Power	69
Mid Tower w. 230W Power.	79
Mid Tower w. 250W Power: Black/ White	139/129
Full Tower w. 250W Power.	129
Full Tower w. 300W Power: Black/ White	199/189
Slim w. 200W (2 drive bay)	79
Hard Disk Drive External Casing	
- 1 half ht or SCSI for Mac, 40W, w. Int cable	85
- 2 half ht or 1 full ht for PC , 60W	119
- 2 half ht or 1 full ht for Mac, w. cables 60W	145
- 3 half ht or 1 full &1 half ht for PC, 60W.	139
- 3 half ht or 1 full &1 half ht for Mac, w. cables	165

3. CONTROLLERS

COREL SCSI software	75
ACCULOGIC	
sIDE-4 plus (2FD & 2IDE HD, 2S & 1 P)	49
ADAPTEC	
1522K SCSI w. Kit (3MB/s)	159
1542CF SCSI w. Kit (10MB/s)	249
1542C Plus w. ASW 500	315
1640 SCSI w. Kit for MCA	335
2742T SCSI EISA w. Kit	399
2842VL SCSI VLB w. Kit	315
ASW-1440 ASPI Netware Manager v3.3	69
ASW-EZ SCSI for DOS & WIN	69
ASW-310 Sy-Tos Plus (tape backup s/w)	99
ALWAY TECHNOLOGY	
IN 2000 High Performance 16 bit SCSI	179
AMI	
FastDisk cache SCSI EISA (up to 16MB)	459
FastLan Ethernet-SCSI VLB	449
BUSLOGIC	
BLI-KT 542B SCSI-2 w. Kit (5Mb/s)	225
BLI-KT 545S Fast SCSI-2 w. Kit (10Mb/s)	229
BLI-KT 742A EISA SCSI-2 w. Kit	339
BLI-KT 747S EISA Fast SCSI-2 w. Kit	389
BLI-BT 445S SCSI VLB w. Kit.	275
DTC	
2290 IDE EISA	139
3280AS SCSI	105
FUTURE DOMAIN SCSI Controller	
TMC 1660 for AT (H only)	119
TMC 1680 for AT (4F& H,15MB/s)	129
TMC 1680 SVP (SCSI value pack)	155
KOUWELL	
4 Floppies controller for XT, AT	33
IDE controller only	27
IDE w. AT I/O (2S 1P 1G)	34
IDE w. NS16550 chips (2S 1P 1G)	59
IDE w. AT I/O (2S 1P) VLB	55
IDE w. AT I/O (2S 1P) w. 16550 chips VLB	79
MYLEX	
DCE 376 EISA SCSI	550
NCL America (w. on board Bios)	
538B IDE for AT (2HD & 2FD)	39
ORCHID	
VLB IDE (2HD & 2FD) w. AT I/O	79
PROMISE Drive Cache Controller	
DC 200 IDE cache up to 16MB	97
DC 2040 SCSI cache up to 16MB	179
- Bios chips & CD driver	39
DC 4030VL IDE VLB cache up to 16MB	129
ULTRASTOR (w/o cable)	
ULT 14F ISA SCSI 32K cache	199
ULT 24F SCSI EISA 64K cache	365
ULT 34F VLB SCSI-2 32K cache	275
WONDER SYSTEMS (USA made)	
IDE w. 4 Floppies	29
IDE w. 4 FD/ 2.88MB/ w. drivers tape , 1.0 Mbps FD speed	39
IDE w. 2HD/ 4FD/ 2S 1P/ w. drivers tape , 5IRQ for com ports, 1.0 Mbps FD speed	45
IDE w. 4FD/ 3S 2P 1G (2S16550 chips)	79
For SCSI HD, w. CD-ROM drivers	59
VL2000 IDE w. AT I/O VLB	49
VL2018 IDE 2HD/4FD/2S/1P/16550/2.88	69

4. CPU

AMD386 DX-40	59
INTEL	
386 DX-25 / DX-33	69
486 DX-33 / DX-50	289/429
486 DX2-50 / DX2-66	339/479
MATH CO PROCESSOR	
CYRIX	
83D87 - 33 / 40	69/69
Cx486 DLC TI 33 / 40	79/99
INTEL	
387DX / 387SX	85/79
OverDrive Processor	
- 486 SX16 / SX20	325
- 486 SX25 / DX25	445
- 486 SX33 / DX33	545
Cooling Fan (heat sink)	19.50

5. DIGITIZERS

SummaSketch III 12x12, 4 or16 button	275
SummaSketch III 12x18, 4 or16 button	549
WACOM	
SD-510C 6 x 9, w. Pressure Stylus	459
SD-510C Tablet + Painter 2.0 (special)	(499)
SD-420E 12 x 12, w. Pressure Stylus	655
SD-420E Tablet + Painter 2.0 (special)	(699)

6. DRIVES

Frame for 3.5" Hard Drive and Floppy Drive	6
Removable Hard Drive Case for 3.5" HD.	39
HARD DRIVES	
CONNER	
CP30174E 170MB 18ms IDE 3.5", 1" ht	185
CP-30254H 250MB 14ms IDE 32K 1" ht.	219
CP-30344 340MB IDE	269
CP-30544 544MB 12ms IDE 1" ht.	499
FUJITSU (5 years warranty by manufacturer)	
2624FA 520MB 12ms SCSI-1&2	569
M2694ESA 1.0GB 10ms SCSI-2 3.5" 1/2"ht	899
M2654S 2.1GB 12ms SCSI-2 5.25" full	1599
MAXTOR	
MXT 7131A 130MB 15ms IDE 3.5"	169
MXT 7213A 213MB 15ms IDE 3.5"	199
LXT 7345A 345MB 14ms IDE 3.5"	279
MXT 7345S 345MB 15ms SCSI 1" ht	345
MXT 540A 540MB 8.5ms IDE 1" ht	639
MXT 540SL 540MB 8.5ms SCSI-2 1"ht	639
MXT 1240S 1.2GB 8.5ms SCSI-2 3.5"	1195
Optical Drives : Rewritable 1 GB 35ms SCSI Ext Tahiti II / 1 GB Cartridge Glass	2595/199
QUANTUM	
EIS 170AT 170MB 17ms IDE	185
LPS-240AT 244MB 16ms IDE 256K cahce	229
LPS-240S 244MB 16ms SCSI 256K cache	245
LPS-525S 525MB 10ms SCSI 512K cache	555
PRO-700S 700MB 10ms SCSI-2 512K	745
PRO-1225S 1.2GB 9ms SCSI 1.2M cache	969
FLOPPY DRIVES	
MICRO SOLUTIONS (External FD)	
1.2 / 1.44 (use printer port)	175
TEAC (Floppy Drive)	
1.2MB 5.25" / 1.44MB 3.5" w. frame	48/42
2.8MB 3.5" w. frame	85
Dual Floppy 1.2MB & 1.44MB	115

7. I/O CARDS

BOCABoard w. cable 4 / 8 / 16 port	99/149/299
KOUWELL	
2S 1P 1G w. NS16550 chipset (XT, AT)	49
4 Serial ports card	69
AT I/O (2S 1P) / AT I/O (2S 1P 1G)	27/27
AT I/O (2S 2P) / AT I/O w. IDE (2S 1P 1G)	33/34
Printer card (2P) / Serial card (XT, AT)	15/15
QUICKPATH	
13 port I/O w. 4-16550UARTs + Extd. IRQs (2 IDE, 4F, 4S, 2P, 1G)	125
4-serial, 16550UARTs, 8addr, 10 IRQ (3,4,5,7,9,10,11,12,14,15)	99
STB 4-COM	
4 serial, 16 bit, w.16554, support COM 1-8, IRQ 2,3,4,5,10,11,12,15	109
SIIG	
2S 1P w. 16550 chipset	49
WONDER SYSTEMS (USA made)	
4S 3P (16 bit, 8IRQ, 16550 FIFO)	135

8. KEYBOARDS

ANCER (Black)	
101 key	45
FOCUS	
FK2001 101 click	42
FK9000 129 keys Programmable	65
NORTHGATE OMNI	
101S / 101NI / 102	55/69/69
Ultra T or F	95
SIIG (click)	
Suntouch Jr. 84-key Mini	45
Suntouch 101	49
OTHERS	
BTC 84-key Mini	37
KeyCat II 101 w. trackball mouse	69
Keytronic 101	37
New Maxi / Maxi 101 / Maxi Key 124	29/35/69
Mitsumi 101	30
PT505C 101	25

9. MEMORY CARDS

ACCULOGIC	
RAMpAT! up to 16MB(SIMM),16 bit, AT	99
SIMM-ply Ram 8/16 bit, 8MB max, XT, AT	99
SIMM-ply Ram 16 bit, 8MB max, PS/2-50,60	119
INTEL	
Above Board w. 512K (special)	(99)

10. MEMORY CHIPS

DRAM	
1 MB x 1 - 80 ns	5.80
64K - 100 ns / 256K - 80ns.	1.39
64K x 4 - 80ns / 256K x 4 - 80ns	1.65/4.80
SIMM	
16 MB x 9 - 70 ns	call
4 MB x 9 - 60 / 70 ns	call
1 MB x 9 - 60 / 70 / 80ns (3 chips)	call
256K x 9 - 70 ns	call
1 MB x 36 - 60 / 70 ns	call
4 MB x 36 - 70 ns	call
SIMM Mac : 4 MB x 8 - 70	call
SIPP	
1 MB x 9 - 70 ns (3 chips)	call
COMPUTER MEMORY (3rd Party) :	
IBM	
- PS/2 50Z/ 55SX/ 65SX/ 70	
-- 2MB / 4MB	95/159
- PS/2 80 - 111/ 311/ 121/ 321 (2MB)	115
- PS/2 80 - A21/ A31/ A6 (4MB)	279
COMPAQ	
- Deskpro 386N/ 386SX20	
-- 2MB / 4MB	109/159
- Deskpro 386 - 20e/ 20/ 25e	
-- 1MB / 4MB	95/185
- Deskpro 486M -- 2MB /4MB /8MB	109/159/319
- LTE 286 -- 1MB / 2MB card	79/129
- LTE 386S/ 386-20	
-- 1MB / 4MB card	89/209
- SLT 286 -- 1MB / 4MB	99/259
- ProLinea 386 - 25ZS/ 25S	
-- 2MB / 8MB	105/375
- ProLinea 486 - 33/ 50/ 25S	
-- 2MB / 4MB / 8MB	95/199/299
KINGSTON MEMORY for	
Apple, AST, AT&T, Compaq, IBM, NEC,Sun	call
NOTEBOOK / LAPTOP (3rd Party)	
AST EXEC 4MB	155
COMPAQ	
- Contura -- 2MB / 4MB / 8MB	105/165/295
- LTE 20/ 25 -- 2MB / 4MB / 8MB	125/189/340
IBM L40SX/ N33SX	
-- 2MB / 4MB / 8MB	125/189/330
MAC PowerBook 140/ 170	
-- 2MB / 4MB	135/179
NEC UltraLite III SL25C	
-- 2MB / 4MB / 8MB	139/249/435
Packard Bell 386SX -- 2MB / 4MB	155/259
Panasonic 170/ 270/ 370 (1MB)	79
TOSHIBA	
- T2200SX 4MB / 8MB	179/299
- T3200 3MB	189
- T3200SX 2MB / 4MB	105/169
- T3100SX 2MB / 4MB	109/167
- T5100/ T13100/ T1600 2MB	115
- T8500/ T5200 2MB / 8MB	125/339
LASER PRINTER MEMORY UPGRADE	
Jet Ram (3rd Party):	
EPSON EPL 6000	
-- 2MB/ 4MB	129/199

HP	
- Deskjet 500/500C -- 256K	75
- Laser Jet IIP+/ III/ IIIP/ IIID	
-- 1MB / 2MB / 3MB / 4MB	79/125/169/215
- Laser Jet II/ IID	
-- 1MB / 2MB / 4MB	99/145/235
PANASONIC	
- KX-P4410/ 4430	
-- 1MB / 2MB / 4MB	95/139/229
- KX-P4420/ 4450i	
-- 1MB/ 2MB/ 4MB	99/145/235
- KX-P4450 --1MB	139
- KX-P4455 --2MB	169
QMS	
- P-S 410 -- 1MB / 2MB / 4MB	99/145/235
- P-S 815/ 825	
-- 2MB / 4MB	159/249
TEXAS INSTRUMENTS	
- Micro Writer --1MB	69
PACIFIC DATA:	
Pacific 4 for HP IIP+/ IIIP/ III/ IIID	
-- 1MB / 2MB / 4MB	89/135/225
1-2-4 Plus for HP II/ IID	
-- 1MB / 2MB / 4MB	115/159/249
Pacific 4 SIMM for HP 4/ IIISi/ XL300	
-- 4MB / 8MB	199/389
ProTracer -- 5MB / 8MB	375/525

11. MODEMS & FAX

ASAP TF-333 Phone & Fax Auto Switching	89
National Semi TyIN 2000 Answer/Fax	145
Micc Global Pocket Fax, Tripple 96	139
Adtech Micro Systems (DOS & WIN)	
Data Fax 9624Vi, MNP5	99
Hi - Per 96/144, MNP5	199
Pocket 96/24 Fax	115
Pocket 144/144 Fax	269
E-Tech	
Ufomate Pocket Fax modem (w. Win/DOS s/w)	
- P1496MX / P9696MX	225/185
- P1414MX (Distinguish ring & Called ID)	259
FRECOM (special)	
Fax 96 w. 1 Liner & Far Fetch Fax	115
Fax 96 & modem for DOS (special)	85
GVC	
14.4 Fax Modem Int / Ext	159/179
HAYES	
Accura 2400 Int / Ext	49/75
Accura 96 + Fax Int / Ext	199/229
Accura 14.4 + Fax Int / Ext	215/245
PCMCIA 14.4 Modem (special)	(345)395
Pocket edition 2400 w. Smartcom EZ	129
Optima 144 Ext + Fax 144	389
SmartCom for Windows	47
Ultra 144 v.32bis, v.42, v42bis Ext	575
V-series SmartModem 9600 v.42, MNP5 Ext	499
INTEL	
Faxability Plus/OCR for WIN trade-up	99
New Fax Modem 24/96 Int	55
New Fax Modem 24V/96 v.42bis Int / Ext	119/129
New Fax Modem 96 Int / Ext	155/165
New Fax Modem 14.4 Int / Ext	169/189
PCMCIA 14.4 Fax Modem	325
SatisFaxtion modem (w. FAXability s/w)	
- 100 Int send96 rec.48, 2400 modem	99
- 200 Int 96/24 v.42, MNP5	245
- 350 Int 14.4 Fax / 96 modem v.42bis	265
- 400 Int 144/144 v.42, v.32bis, MNP5	295
- 400e Ext 96/14.4, 4K data buffer	335
MEGAHERTZ	
PCMCIA 14.4 Fax modem / w. X-Jack	345/355
PCMCIA 96/24 Fax modem w. X-Jack	225
P2144 Pocket 14.4/14.4	325
MICROCOM	
Microporte 4232bis Fax modem	465
QX 4232bis / QX 4232bis + modem	455/575
PRACTICAL PERIPHERALS	
PM14.4FX14.4 Int	219
Pocket 14.4 Fax Modem	369
Mini Tower 96/96 Ext / 14.4/14.4 Ext	209/235
PM2400 Mini pocket modem	119
FaxMe (turn HP Laser to Fax receiving)	175
SHIVA	
Net Modem/E Ethernet BNC/TP	1475
SIIG	
TeleCommunicator 10-in-1 Fax Modem	229
US ROBOTICS	
Courier 144 w. Fax Ext	399
Courier 16.8 Int / w. Fax	459/499
Courier 16.8 Ext / w. Fax	495/545
Courier Terbo Fax 19.2 MB w. ASL	525
Sportster 96 modem MNP5 Int/ Ext	149/149
Sportster 96/96 Fax Ext	159
Sportster 14.4/14.4 FAX MNP5 Int/ Ext	169/189
Sportster 14.4/14.4 Fax for Mac Ext	209
Shared Access Modem Sharing Kit	675
ZOLTRIX	
2400 baud modem w. MNP5 Int	39
96/24 send & rec. fax/modem w. MNP5 Int	69
96/24 fax/modem v.42, MNP5 Int	99
14.4/14.4 fax/modem Int	159
ZOOM	
AFC Int / AFX Ext	59/79
FC9624V w. WinFax Lite Int	85
FX9624V w. WinFax Lite Ext	89
96/96 w. WinFax Lite Int/ Ext	189/199
144/144 w. WinFax Lite Int/ Ext	205/219
ZY-XEL	
U1496B 16.8 voice 14.4 Fax WINs/w Int	315
U1496B+ upgradable to 19.2Kbps Int	425
U1496E 16.8 voice 14.4 Fax WIN, LED Ext	319
U1496E+ upgradable to 19.2Kbps Ext	429

12. MONITORS

Monitor Saver	45
9" VGA Mono paper white 640 x 480	135
EMC	
EM 1412 14" Mono amber, 90-260v	95
EM 1417 14" 1024 x 768 VGA Mono paper white	125
EM 1428 14" 1024x768 .28, 90-260v	269
EM 1430K 14" 1024 x 768 .28, NI, 90-260v	299
EM 1439G 14" 1024 x 768 .39	229
HITACHI	
CM2095 20" 1280 x 1024, .31 w/0 cable	1325
CM2187 21" 1600 x 1280, .31 w/o cable	2045
Accuvue PS20 20" 1600 x 1280, .28	1695
Accuvue PS21AM 21" 1600 x 1280, .28	2395
MAG (Auto Switch Power Supply)	
MX15F MPRII 15" Flat 1280x1024 .28, NI	495
MX17F MPRII 17" Flat 1280x1024 .26, NI	925
Mac Adapter	25
M VIEW	
L1428 14" Mono Amber	95
MITSUBISHI	
HL6955SETK 20" 1280x1024 .31, NI	1745
Diamond Pro(TFS 6705) 17" 1280x1024 .26	
NI,Trinitron, MacII, 100-240v	1045
BNC Cable	39
NANAO (100-240v)	
F340iW 15" Full Flat screen,1024x768 .28	545
F550iW 17" 1280 x 1024 .28, NI, Mac	1165
F560iW 17" 1280 x 1024 .28, NI	1399
F550i 17" 1280 x 1024 .28 NI, Mac	975
T560i 17" 1280x1024 .25, NI, MacII	1675
T660i 20" 1280x1024 .31, NI, Trin., MacII	2395
F750i 21" 1280x1024 .31, NI, MacII	1995
MacII cable adapter	69
NEC (120v)	
3FGe 15" 1024x768 .28, Mac	589
4FGe 15" Flat 1024x768 .28, NI, Mac	689
5FG 17" 1280 x 1024 NI	1345
5FGe 17" 1024x768 .28 NI (no Accu color)	1075
6FG 21" Flat 1280x1024 .28, Mac	2395
NEC Monitor Lens (Anti-reflection, Anti-static)	
- for 4FG / 5FG / 6FG (special)	(65)/(105)/185
FG / MacII cable adapter kit	19.50
PANASONIC (90-140v)	
C1381i 14" SVGA 1024x768 .28, Int, MacII	325
C1395 14" 1024x768 .28, NI, MacII	435
C1991 20" 1024x768 .31, NI, MacII	1395
SAMSUNG	
CSK5577L 15" 1024 x 768 .28 NI	455
CSA7571 17" 1024x768 .31	695
CSF7487 17" 1280x1024 .26, NI, 90/264v	899
SEIKO (90-132v)	
CM2050 20" 1024x768 .31, NI, Mac	1395
SIIG	
9" Mono paper white	115
Standard Technologies	
400-M VGA Paper white	125
SONY	
1430S 14" 1024x768 .25, NI, 120v	575
17SEI 17" 1600 x 1280 .25	1295
1730 17" 1024x768 .25, NI	995
2038 20" 1280x1024 .30, NI	2195
VIEWSONIC	
4e 14" 1024x768 .28, Int,110/220v	279
5+ 14" 1024x768 .25, NI, MacII	475
6e 14" 1024x768 .28, NI	299
15 15" 1280x1024 .28, NI, Mac II	489
17 17" 1280x1024 .28, NI, Mac II	1035
20 20" 1600x1280 .28, NI, Mac II	1695
21 21" 1600 x 1280 .26 NI, Mac II	1925
Mac cable adapter	35

13. MOTHERBOARDS

386-40 w. 128K cache (no cpu)	129
486-33 128K ISA (no cpu)	135
486-DX2-66 256K VLB w. Zip socket (no cpu)	149
AIR (w/o cpu)	
486-33 / DX2-66 256K, 3VLB slots	235
486-33 / DX2-66 256K EISA, 3 VLB slots	425
ALARIS (by IBM)	
486SLC2-66 64K VLB w. CPU & Math Pro	420
AMI	
Super Voyager 486-33 256K VLB	795
Super Voyager 486 DX2-66 VLB	995
Super Voyager II 486-33 256K VLB	675
Super Voyager II 486 DX2-66 VLB	895
Enterprise II 486-50 EISA 128K	995
Enterprise III 486-33 256K VLB EISA	875
Enterprise III 486-50 256K VLB EISA	1025
Enterprise III 486 DX2-66 VLB EISA	1095
Enterprise IV 486-33 256K VLB EISA	975
Enterprise IV 486 DX2-66 256K VLB EISA	1195
IBM	
486SL-C2-33 / 66 16K internal cache ISA v.2	
w. CPU & Math Processor	285
LYNX (made in USA, w/o cpu)	
486DX - 33 / 50 / DX2-66 256K VLB	149
MICRONICS	
386SX-20 Phoenix BIOS (32MB max)	175
386-33 64K cache Gemini (32MB max)	299
486-33 Local Bus w. 256K cache	635
486-DX2-50 VLB w. 64K / 256K	595/695
486-DX2-66 Local Bus w. 256K cache	845
JX30 486-DX2-66 VLB 256K w. Zip socket	920
486-33 256K EISA VLB	845
486-50 256K cache EISA E2	1195
486-DX2-66 256K EISA VLB	1045
MiniBoard 486-33 256K cache ISA	625
MiniBoard 486-50 256K cache ISA	735
MiniBoard 486-DX2-66 256K ISA	845
16MB Memory Card	150
NICE (w/o cpu)	
486-33 / DX2-66 256K VLB	215
486-50 / DX2-66 256K Mini EISA VLB	265
486-50 / DX2-66 256K EISA VLB	425
ORCHID (w/o cpu)	
Superboard 486 (VLB for VGA & controller)	
- DX33/ DX50/ DX2-66 256K	185/199/185
QUICK-PATH	
486-50 w. 64K cache, 15ns ISA (no cpu)	235

14. MOUSE & JOYSTICK

AGILER	
AGM-600E Serial 400 dpi	23.50
ATB-610 Serial Trackball	24.50
Keen	12.50
ANCER (black)	
3-button	25
APPOINT (portable)	
MousePen Pro	49
Thumbelina	49
KENSINGTON	
Bus 4.0	119
Expert serial & trackball	99
LOGITECH (call for rebate info.)	
Cordless II (new)	85
Dexxa Serial / First Serial	27/37
Fotoman Plus Camera for PC & PS/2	549
Mouseman Bus / Serial	59/54
Scanman 256	169
Scanman 256 w. CatchWord OCR	199
Scanman 256 w. OmniPage OCR	209
Scanman color - 16.8 million colors	439
Trackman Portable / Trackman Combo	89/75
MICROSOFT	
Mouse 2.0 w. WIN 3.1	149
Ball Point (portable)	119
Bus 2.0 (oem) / w. Bus Card	53/75
Bus 2.0 w. Expansion Card	89
Serial 2.0 (oem)	49
Serial 2.0 w. PS/2 port (special)	(69)79
Serial 2.0 w. 9 to 25 pin adapter (special)	(65)79
MOUSE SYSTEMS	
New Point (trackball for laptop & PC)	54
Little Mouse PC (2 button optical) serial	29
Omni (2 button) MS compatible	25
PC Mouse (3-button optical)	59
PC Trackball II	55
Page Brush - color scanner (special)	(249)399
Serial Bus Card (9 IRQs)	24
The New Mouse 400CPI (3 button)	55
JOYSTICK :	
Gravis Game pad	26
Warrior 5, Quick shot	14.50
Adapter kit	16.50
THRUSTMASTER	
ACM Gamecard	29
Flight Control System	75
Fight Control System Pro	125
Flight Stand - Holder	19
Rudder Control	125
Weapons Control MK II (special)	(119)139

15. NETWORK

MAILMAN 2.0 (10-user for Novell NetWare)	199
3COM	
3C503 8 bit coax / TP ethernet	179/199
3C503-16 Etherlink II 16 bit coax / TP	169/179
3C507 16 bit Ethernet coax / TP	279/299
3C509 Etherlink III coax / 5 pack	135/575
3C509 Etherlink III TP / 5 pack	139/585
3C509 Combo / 5 pack	155/625
3C579 Etherlink III EISA coax / TP	245/249
3C529 Etherlink III for MCA / TP	245/249
3C621 Link Builder 10 BT (12 port)	699
3C16270 Link Builder TP (12 port Hub)	395
TokenLink III 16/4 ISA/ MCA/ EISA	465/495/645
3C551 Link Watch SNMP/NLM software	259
ADDTRON (Novell compatible)	
AE-200LC 8 or 16 bit BNC & TP	69
ET-200STS NE2000 coax compatible	65
ET-220TPS NE2000 TP compatible	65
AE-200STA NE2000 3 in 1 Combo	75
Starter Kit for Novell Lite 1.1 / for Win	245/265
Starter Kit for Lantastic AI DOS / WIN	275/295
Transceivers : ET10TB (TP<-->AUI)	49
Transceivers : ET10CB (BNC<-->AUI)	49
HUB : UTP8 (8TP + 1BNC)	235
HUB : UTP16 (16TP + 1BNC + 1AUI)	495
Pocket Adapter : BNC / TP	135/139
Boot PROM	15
Arcnet :	
- Arc120TP 8bit Combo	59
- Arc220TP 16bit Combo	69
- 8 port active Hub coax / TP	135/145
Token Ring - 16/4 ISA / MCA	379/399
Token Ring - Mau 1 / Mau 3	295/295
ALLIED TELESIS (CentreCOM)	
AT-1500T TP / AT-1700T	79
AT-1500BT / AT-1700BT (TP+BNC)	99
ARTISOFT (Lantastic)	
AE-2 Ethernet starter Kit v5.0	449
AE-2 Ethernet starter Kit v5.0 WIN	509
AE-2 Ethernet adapter	(oem 185)195
AE-3 Ethernet starter Bundle / for Win	495/569
AE-3 Ethernet adapter / NR2000A	225
2Mbps starter kit DOS / WIN	355/415
2Mbps 1-user kit / for MCA	139/215
AE-2/T 16bit 10Base-T adapter	199
64K RAM upgrade for AE-2, AE-3 adapter	45
AI software v5.0 DOS / 6 pk / 12 pk	75/395/720
AI software v5.0 WIN / 6 pk / 12 pk	85/455/840
AI Starter Kit NR-SI 2000C DOS / WIN	339/359
Articom - LAN modem sharing s/w	279
Central Station Connectivity Processor 5.0	399
Ethernet s/w kit 5.0 w. cable DOS / WIN	79/139
Lantastic Z (2 stations) v5.0	89
Lantastic for Netware (Network O/S)/ v5.0	99/275
Lantastic for Mac s/w Kit	339
T - Runner 8 Port Hub / 12 Port Hub	320/520
Lantastic for TCP/IP single / 5-user	185/760
Lantastic Print Server Station Ware	69
Netware Print Server Station Ware	69
Network Eye - Remote Control Access	(129)155
NR 2000C (BNC only) / Starter Kit Win	172/469
NR 2000T (RJ 45 only) / 6 pk	175/999
NR-SI 2000C / 2000T (special)	(99)
NR-SI 2000A Combo (special)	(119)
Peer-Hub 10Base-T concentrator	270
Remote Boot ROM for AE-2, AE-3 adapter	45
Sounding Board adapter Kit	69
StationWare (Dial Up Connection)	69
ASANTE	
Network products	call
CASTELLE	
JetPress (Network Print Server)	
for HP II,IID,III,IIID, coax / TP	429
LANPress (Print Server) connects up to 4 printers	
- Ethernet Thick/Thin coax (1P 3S)	475
- Ethernet Thick/Thin coax (2P 2S)	625
- Ethernet 10BaseT (1P 3S) / (2S 2P)	475/635
CC:MAIL	
cc:Mail DOS platform v4.0	199
cc:Mail WIN platform v2.0	335
cc:Mail 10-user / 25-user pack	239/579
cc:Mail Gateway v3.21	859
cc:Mail FAX v1.2	1350
cc:Mail Remote	199
cc:Mail Router 4.0	875
COMPULAN	
Arcnet	
- 4-port Arcnet Passive Hub	19
- 8-port Coax Stackable Active Hub	149
Ethernet	
- 8 bit E100 coax / ET500TP	65
- 16 bit E200 coax / ET600TP	75
- Boot Prom (for E100/ E200/ E500/ E600)	25
D-LINK	
DE-205 TP : 4 Port Hub + 16 bit card	295
Other Network Cards	call
KINGSTON	**call**
FARALLON	
PN381 PhoneNet w.Timbuktu for WIN	259
GATEWAY COMMUNICATION	
G/Ethernet 16 coax / 32 bit (special)	69/299
IBM	
PCMCIA for Token Ring 16/4	579
PCMCIA 10B2 / 10BT	295/295
INTEL	
EtherExpress Flash LAN Adapter (combo)	145
EtherExpress 16 coax / 5 pk	(115)/505
EtherExpress 16 TP / 5 pk	(117)/509
EtherExpress 16 MCA / 16 MCA TP	175/185
EtherExpress 32 EISA	439
12 port Hub EtherExpress ISA / EISA	565/645
LAN Protect 1.5 (virus protection)	685
LAN Sight 3.0 Netware Utility / Monitor	299
LANSpool s/w 386 NLM v3.5A	425
Netport II Thin & Thick / 10BT	395/399
Netport Express XL	465
NetSatisfaxtion V.2 (s/w for NOVELL)	955
RJ45 Harmonica	55
TokenExpress 16/4 ISA/ EISA/ MCA	435/655/475
NOVELL (Eagle)	
NE2000 plus coax ethernet / 5 pack	(119/525)
NE2000-TP plus TP ethernet / 5 pack	(105/475)
NE2000 Netware Lite starter kit / Win	355/375
NE2000 Plus Combo / 5 pk	(125/550)
NE3200 Eagle EISA w. TPA (special)	(545)
Microdyne NE2000 5 pk (special)	(499)
NTR 2000 Token Ring	435
EPROM for NE2000	35
EXOS NE10T-Hub, 8 Port (8 TP + 1 coax)	(295)
Print Server NPE400	350
Netware Lite 1.1 + DR DOS 6.0	65
Netware Lite w. Win Utilities	75
Netware 3.12	
- 5 / 10 / 25-user	585/1295/1895
- 50 / 100 / 250-user	2525/3525/6525
Netware 4.01	
- 5 / 10 / 25-user	825/1825/2625
- 50 / 100 / 250-user	3595/5495/9695
SMC (Western Digital)	
8003 Plus Elite 8 bit coax	115
8013 Plus Elite 16 coax / 6 pk	125/625

8013 Plus Elite 16 TP / 6 pk	127/629
8013 Elite 16 combo / 6 pk	149/775
8013 Plus/A for MCA / TP	195/199
8033 Elite 32 bit coax / TP	595/599
Elite Ultra 16 Ciax / TP	110/112
Netware Boot ROM for ethernet	34
8 Port Concentrator (8TP+1AUI)	349
12 Port Concentrator(12TP+2AUI+1BNC)	595
Token Ring 16/4 ISA / MCA	379
Token Elite Passive MAU 8 / MAU 16	445/599
WD-8003 EP 8 bit Plus Elite	49
WD-8003WT 8 bit EtherPlus TP (w. cable)	29
SYNOPTICS	**call**
XIRCOM	
PCMCIA CE-10B2 BNC / CE-10BT	285/289
PCMCIA CE-10BC Combo	325
PE3-10B2 coax pocket adapter	285
PE3-10BT TP pocket adapter	289
PE3-10BC Combo pocket adapter	325
CABLES & ACCESSORIES	
Twisted pair cable, TP 4-pair, PVC, Level 3	
- 1000' / 500' / 200'	89/55/35
10 BASE-T cable, 1000' Level 3 plenum	165
RG58 cable, 500' / 1000'	65/109
Belden 8259, RG58, 1000'	165

16. NOTEBOOK

CYPRESS	
486 DX-33 w. 4MB RAM, 120MB HD, VLB	
- 820 monochrome	1795
- Active Color Matrix	3565
- Dual Scan Color	2625
Notebook Docking Station w. 4 slots	479

17. POWER SUPPLIES

AMERICAN POWER CONVERSION (UPS)	
APC-400 Smart-UPS (286, 386 WS)	289
APC-600 Smart-UPS (386, 486 FS)	359
APC-900 Smart-UPS (386, 486, FS & WS)	569
APC-1250 Smart-UPS (multiple FS & WS)	725
APC-400 Back-UPS 286, ps/2, 386	179
APC-450 Back-UPS 286, ps/2, 386	215
APC-600 Back-UPS 286, 386 FS	285
APC-900 Back-UPS	395
APC PowerChute Plus :	
- for Novell	69
- for OS/2, Lan Server, 3 Com	75
- for UNIX / XENIX	99
Power Doctor (DOS) I/F Kit for Smart-UPS	79
GENERAL	
250W for Baby AT/ Baby or Mid Tower	45
250W for AT / for Full Tower	47/49
300W for Full Tower	69
550W for UPS	279
1200W for UPS	659
PC POWER COOLING	
Standard 220 for desktop / full tower	85
Silencer 270	
- for slim (baby or mid tower)	149
- for AT desktop / full tower	165/165
Turbo-Cool 300	
- for slim (baby or mid tower)	149
- for desktop / full tower	175/175
Turbo-Cool 450 for desktop / full tower	325
TRIPP LITE	
BC 500 Lan (UPS, 350W)	215
BC 900 Lan (UPS, 650W)	365
Iso - Bar	call
Omni 450 Lan (UPS 325W + Line Regulation)	275
Omni 600 Lan (UPS 425W + Line Regulation)	339
Omni 900 Lan (UPS 650W + Line Regulation)	499
UPS Monitoring Board for NetWare	59

18. PRINTERS

BROTHER	
HJ-400 Desktop Ink Jet for PC or Mac	295
HL-6T Laser 6ppm (2 yr. warranty)	575
CANON	
BJ-200 InkJet	319
BJ-300 desktop	349
CITIZEN	
GSX 145 (24 pin, 132 column)	355
- Color Option for GSX 145 / for GSX 130	65/45
GSX 230 Fonts & quiet (rebate $40)	229
GSX 240 Scalable Fonts & quiet (rebate $40)	285
PN48 notebook, 1ppm, 2lb, battery, case	299
FUJITSU	
DL1200 24-wire dot matrix	275
HP (HEWLETT PACKARD LaserJet w. toner)	
Desk Jet 500 / 500C / 550C	295/395/585
Desk Jet 1200C / Postcript	1375/1975
Jet Direct 10BT	429
Laser Jet 4 / 4M / 4L / 4ML	1349/1865/669/1025
Laser Jet 4P w. 2MB (new)	975
Laser Jet 4Si / 4SiMX	2995/4295
Paint Jet / Paint Jet XL300	695/2295
LASER MASTER	
Utility XL1200 / XLT / XLO	4795/6495/7995
Win Printer 800 (Postscript)	1075
Win Printer XL600 11x17, 600x660PPI	2395
WinJet 1200 Postscript for HP 4 (special)	(695)
MICROTEK	
TrueLaser MTP-306 6ppm, 2MB, 35 fonts	1195
PACIFIC DATA PRODUCTS	
ProTracer Inkjet, A to C size output, 360dpi, i960RISC processor, 512K, 45dBA	1075
ProTracer accessories :	
- Postscript emulation card	375
- HP-GL emulation Card	315
- Sheet Feeder I / II	135/115
- Ink Cartridges	19.50
Pro Tracer HP GL Bundle w. 5MB	1695
PANASONIC	
1124i / 1624	259/379
- Auto Sheet Feeder for 1124 KX-P36	120
2023 24pin, quiet printer	199
2123 24 pin, 43.5dBA, color capability	239
2124 24 pin, 43.5dBA, color capability	319
2624 24 pin, quiet printer, 46.5 dBA	399
2180 9 pin, 45 dBA, color capability	169
1150 9 pin, 55 dBA,	139
Color upgrade Kit KX-PCK11	49
Single bin cut sheet feeder KX-PT10	95
32K Buffer dot matrix printers KX-P43	65
Serial interface card PS-13	75
4410 Laser, 512K, 5ppm	569
- Corona KX-PCR3	45
- Developer KX-PDP4	105
- Drum KX-PDM4	89
- Extra cassette KX-PKC2	45
- Fuser unit KX-PFS5	105
- Optional second cassette KX-P495	135
- Toner KX-P453	35
- Fonts Card KX-P47x (for Lasers)	95
4430 Laser, 1 MB, 5ppm	675
- Accessories same as 4410	
4420 Accessories	
- Developer KX-PDP2	95
- Drum KX-PDM2	99
- Envelope Tray KX-P431	59
- Legal Tray KX-P425	45
- Ozone Filter KX-PFT2	26
- Toner KX-P451	39
4450i Laser 11ppm	955
4450 Accessories same as 4450i	
- Developer KX-PDP1	95
- Drum KX-PDM1	145
- Envelope Tray KX-P430	59
- Legal Tray KX-P420	45
- Ozone Filter KX-PFT1	29
- Toner KX-P450	35
4455 Postscript, 11ppm	1695
- others same as 4450i	
QMS (Adobe Postscript)	
QMS-PS 410 4ppm, 2MB, 45 Fonts	1095
- Envelope / Legal / Letter Tray	69/69/69
- Lower Cassette w. Letter Tray	149
- Toner	95
OKIDATA	
Printers and accessories	call
SEIKO	
Smart Label Printer Pro	245
Box of Label (2 rolls per box)	10.95
TEXAS INSTRUMENTS	
Micro Writer PS17 / PS35 5ppm	935/1195
XLPS 17 16ppm	1895
- Apple Talk Kit	99

Laser Printer Accessories:

COMPUTER PERIPHERAL	
Jet Page for HP II (special)	(125)
HP	
Optinal 500 sheet Legal Letter A4 (Jet 4)	279
Envelope Power Feeder 75 sheet (Jet 4)	279
Legal, Letter or A4 250 sheet Tray (Jet 4)	99
Legal, Letter or A4 500 sheet Tray (Jet 4)	109
Lower Cassette w. letter tray for IIP, IIIP	149
Toner for Jet II, III	79
Toner for Jet IIP, IIP+, IIIP	66
Toner for HP4 / 4L	109/69
Postcript for Jet 4	359
IQ ENGINEERING	
True Type Master Library	29
Super Cartridge 2 & 2LS for HPII & III	(269)
Super Cart. 3 Pro+ for HP III, IIID, IIIP, IIISi	199
Desk Jet 500 / Desk Jet Plus Professional	99
PACIFIC DATA	
25 in One! (for Deskjet 500)	99
25 in One! III	
- for HP II, IID, IIP, IIP+, III, Microtek	245
Complete Font Library for HP III, IIID, IIIP	255
Font Bank for all HP Laserjet (New) stores soft fonts, 0.75MB / 1.5MB	205/269
Headlines Cartridge for HP II, IID, IIP	185
Paicfic Connect XI	
- For HP II, IID, III, IIID :	
-- 5 port 256K / 1MB (4S, 1P)	319/389
-- 10 port 256K / 1MB (10S)	449/519
- For HP 4, IIISI, Paint Jet XL300 :	
-- 7 port 1MB / 4MB (6S, 1P)	449/649
-- 10 port 1MB / 4MB (10S)	519/719
Pacific Page & 2MB (Postscript for HP II)	389
Pacific Page II / XL w. 4MB (Postcript for HP II)	719
Pacific Page 4 (Postcript for HP 4)	279
Pacific Page P.E.(HP IID,IIP,IIP+,III,IIID,IIIP)	279
Pacific Page P.E. & 2MB	405
Pacific Talk	179
Pacific Page PE XL (HP IIP, IIP+, III, IIID, IIIP)	
Pacific DirectNet (for Novell)	369
Pacific DirectNet (for Novell & UNIX)	499
Postscript w. 4MB & accelerator board	719
Plotter in a Cartridge (HP II)	225
Plotter in a Cartridge P.E.	
- for HP IID, IIP, IIP+, III, IIID, IIIP	225
PELICAN All type ribbons	visit us

19. SCANNER

Hand scanners .... see **Logitech** in sec.14	
E-TECH	
4256G 256 gray scale (w.OCR)	99(115)
4200C 256/4096 color (w.OCR)	269(289)
HP	
ScanJet IIP w. Kit	749
ScanJet IIC Color w. Kit	1295
MICROTEK	
Scan Maker II w. PhotoShop LE	899
Scan Maker IIXE w. PhotoShop	1150
TAMARACK	
ArtiScan Flatbed 24bit color 256 gray levels	
- w. Publisher L.E. 600/800/1200 dpi	845/1045/1695
- w. Pub.L.E. &OCR 600/800/1200 dpi	895/1095/1745
- w. Photostyler 600/800/1200 dpi.	995/1195/1845
- w. PhotoShop 2.5 600/800/1200	1045/1245/1895
Slide Scan Kit (transparency, slide, X-ray)	
- 600/ 800/ 1200 dpi	525/525/595

20. TAPE BACKUP

ARCHIVE	
Viper 2150S Int	345
COLORADO	
Backup for Windows	45
DJ-10 120MB QIC-40 w. cable / w. Win.	119/149
DJ-20 250MB QIC-80 w. cable / w. Win.	169/199
- AB-11 Ext tape port	39
- Cable (2 Floppies & tape back up)	7
- FC-10 Controller	85
- KE-09 Ext Kit w/o controller	75
- TC-15 controller w. data compression	179
- Unix/ Xenix driver for DJ-10, 20	99
PowerTape PT-25 2GB 300KB/s Int	965
PowerTape PTE-25 Ext	1095
PowerTape PT-50 4GB 300KB/s Int	1525
PowerTape PTE-50 Ext	1655
Trakker 250MB Ext (printer port)	339
Trakker 120MB Ext (printer port)	299
CONNER	
Tape Stor 250MB w. 3M Cartridge	145
EXABYTE	
Tape Drives	call
SUMMIT	
SE250 250MB w. Backup software & free Cartridge offer	165

21. VGA CARDS

INTEL Smart Video Recorder	525
Paradise Window Accel 31X 1MB	159
Standard 24 VLB 1MB	105
Video Plus (video image grabber)	239
V-Mate Pro (flicker free ext. video encoder)	199
WinVision (video capture)	165
(All cards 1024x768 except as stated)	
CGA / MGP card (Monographic w. Printer)	29
ET4000 Tseng Lab 1MB ISA / VLB	89/119
Oak087 Super VGA 512K	52
Oak077 Super VGA 1MB	65
AMI	
FastView EISA VGA Graphics 1MB	175
FastView P9000 VLB 2MB	395
ATI	
VGA Stereo F/X 512K (PC Sound & VGA) w. speakers	159
Wonder XL 24 1MB, Hi-color, w. mouse	145
Graphics Ultra Plus DRAM VLB	239
Graphics Ultra Plus 2 DRAM w. mouse	269
Graphics Ultra Pro 2MB	345
Graphics Ultra Pro 2MB VRAM VLB	395
Graphics Ultra Pro 2MB EISA	425
DIAMOND	
Stealth 1MB VRAM w. Sierra Hi-color	189
Stealth 24 1MB DRAM 16 million color	165
Stealth 24 1MB DRAM VLB	169
Stealth Pro VRAM 1MB / VLB	255/265
Stealth Pro VRAM 2MB / VLB	349/359
Viper VLB P9000 VRAM 2MB	395
MEDIA VISION	
ProGraphic 1280 (new)	699
METHEUS	
Premier 928 w. 4MB VRAM ISA	765
Premier 928VL4 w. 2MB VRAM VLB	599
- 1MB Memory upgrade VRAM	129
MYLEX	
GLE911 1MB, 1280x1024, EISA	399
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III SOFTWARE

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Learning Heaven
Mixed-up Mother Goose
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Peter and the Wolf MPC
Pheonix Shareware
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Resource Graphics I (shareware)
Space Quest IV - Roger Wilgo (oem)
Stellar 7
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- Heather Hit her First Home Run
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- Moving Gives Me Stomach Ache
- Mud Paddle - Paper Bag Princess
- Tale of Benjamin Bunny
- Tale of Peter Rabit
- The Scary Poems for Rotten Kids
- Thomas Swimsuit
Family Education Collection
Great Cities I / II
Language/OS
Laser Printer Companion LOOM
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Media Music Shop
Multimedia Music Training
PC Media PC SIG Library vol.12
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Reference Library
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Secret Weapons of the Luftwaffe
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Who Kill Sam Rupert
Wing Commander w. Ultima 6

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Corel Artshow 3 (Book + CD) MPC
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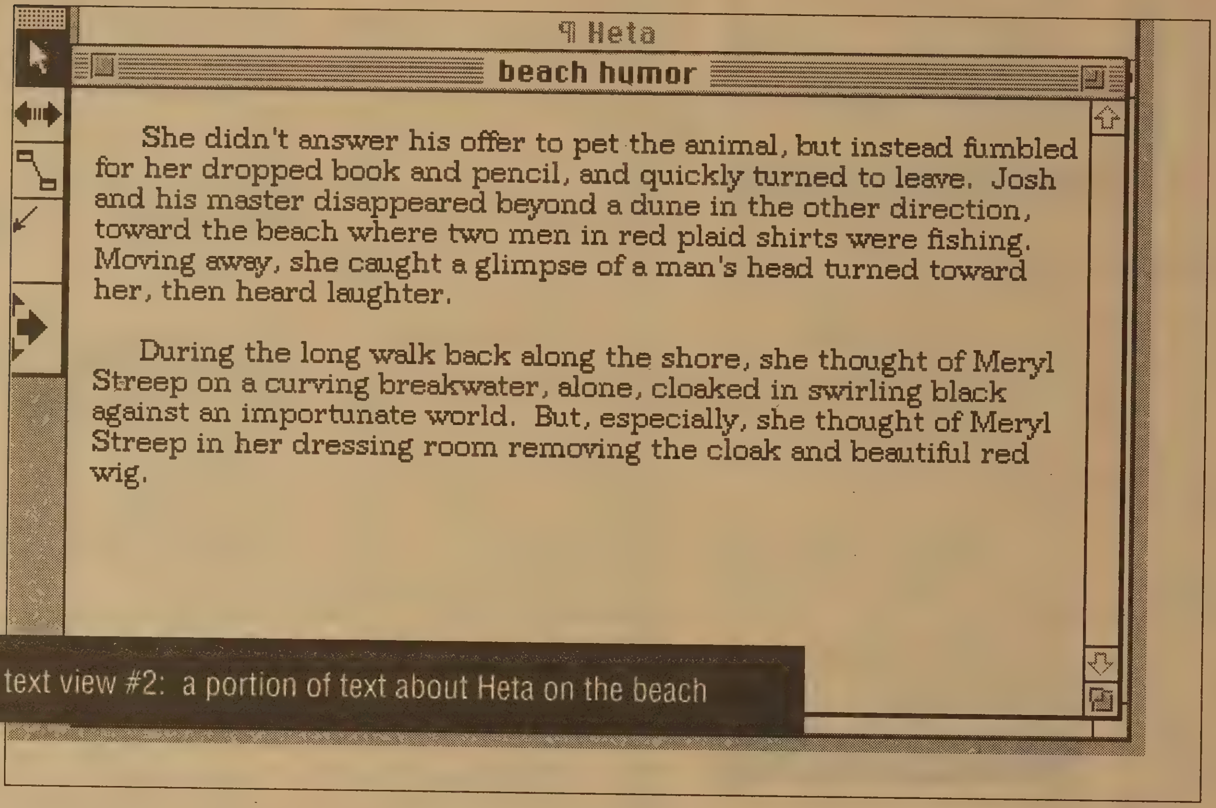
continued from page 300

Computer graphics, and in particular animated graphics, can be so seductive that they detract/distract from the power of words alone.



She didn't answer his offer to pet the animal, but instead fumbled for her dropped book and pencil, and quickly turned to leave. Josh and his master disappeared beyond a dune in the other direction, toward the beach where two men in red plaid shirts were fishing. Moving away, she caught a glimpse of a man's head turned toward her, then heard laughter.

During the long walk back along the shore, she thought of Meryl Streep on a curving breakwater, alone, cloaked in swirling black against an importunate world. But, especially, she thought of Meryl Streep in her dressing room removing the cloak and beautiful red wig.

text view #2: a portion of text about Heta on the beach

work that she likens to a lake with many coves. "A cove of a lake is more comprehensible than the lake itself," she writes as the work begins. "Yet a cove does not exist separately from the lake, flowing out into and being filled by it. Whatever we can understand about a cove may be held in one's hand, but the lake remains blessedly incomprehensible, coming out and going in."

Art school, painting, and an artist's sense of color are recurring themes in Guyer's complex, densely structured hyperfiction—as well as lake imagery and pieces of broken glass gathered from the lake. Also surfacing and resurfacing (around the character of Angela) is the idea of being a nun. "What if she doesn't enter a convent, but does always dress in clothing reminiscent of that untaken habit? Is she then *merely* self-indulgent? A sort of quibbler?"

And later as Angela walks wearing her long rosary: "The weight of it moved with her skirts between and around her legs as she walked. It was like dancing *with* someone. She wondered sometimes if she should confess this pleasure. But how?" Because Guyer believes in making her structures visible to the reader, rather than using "guard fields" (devices that hide links and channel the reader), *Quibbling* is an excellent hypertext for writers who are interested in using Storyspace to read before they begin to work.

MORE ABOUT STORYSPACE

Storyspace lets authors create a distributable reader that enables Macintosh users who do not have this application to read Storyspace works. It also provides the capability to convert Storyspace documents into HyperCard stacks. Unfortunately, while graphics can be imported, Storyspace does not facilitate the simultaneous creation of integrated word/graphic combinations.

LINKSWARE

LinksWare (Macintosh System 7.0 and higher) looks like an application that would work particularly well for writers whose thought process and writing style is more suited to writing many pages than it is to writing screen-sized text building blocks. LinksWare makes links between preexisting texts (as well as sound, graphics, and video) with just a mouse click, and has been used by writers as diverse as artist Sara Armstrong, the San Jose Police Department, and a sign-language-using gorilla.

THE NEW LITERATURE

Just as film and video have altered visual art, making the single framed image a disappearing cultural artifact, computer text works will reshape our literature, eventually replacing the sequential book. The new literature will be more than word processed pages turned by pushing buttons. The viewer/reader will be connected to computer books in ways not possible with paper books—through varying degrees of interaction, through the computer's musical instrument like responsiveness, through text access methods which simulate the reader's own thought processes, and through the visual qualities of the framed and glowing monitor. ■

RESOURCES:

Brian Thomas
riverTEXT
P.O. Box 2517
Portland, OR
97208-2517
Email:
73057,377@Com-
puserve.Com

***Quibbling, The Complete Brian Thomas,* Storyspace**
Eastgate Systems, Inc.
134 Main St.
Watertown, MA
02172
1-800-562-1638

The Visual Plough* (Ron Buck's Visual Poetry*)
Connected Editions
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71
or go "acen," type
arts

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14" Mega Image Super VGA Color Monitor (0.39)	195
14" Mega Image Super VGA Color Monitor (0.28)	219
14" Mega Image Super VGA Color Monitor (0.28, Non Interlaced)	239
15" Flat Screen Super VGA Color Monitor (0.28 , 72 Hz Non Interlaced)	339
15" ADI 4A Flat Screen Super VGA Color Monitor (0.28, Digital Control)	415
17" ADI 5A Flat Screen Super VGA Color Monitor (0.28 Digital Control)	799

Keyboard

101 keys Enhanced Keyboard	$19
101 *Click* Keys Enhanced Keyboard	35
Maxi Switch 101 Keys Enhanced Keyboard	35
Keytronic 101 Keys Enhanced Keyboard	39

Controller

16 Bit IDE Floppy/Hard Disk Controller w/2 Serial, 1 Parallel, 1 Game Port	$13
32 Bit IDE Floppy/Hard Disk Controller w/2 Serial, 1 Parallel Ports (VL-Bus)	39
32 Bit IDE Caching Controller (0.3ms Hard Disk Access time,7MB /Sec)	169
8 Bit SCSI Controller for All CD Rom Drive	49

Modem

Zoltrix 2400 Data w/ 9600 Send Fax Internal Modem	$29
Zoltrix 2400 / 9600 Send & Receive Fax Internal Modem With Bit Fax for Windows Software Included	49
Zoltrix 14,400 / 14,400 Send & Receive Fax Internal Modem	129
Zoltrix 14,400 / 14,400 Send & Receive Fax External Modem	175

Tape Backup

Archive 250MB Tape Backup w/ Free Tape	$169
Colorado 250MB Tape Backup w/ Tape	189
Archive Viper 525MB SCSI Tape Backup w/ Adaptec SCSI Controller	799

ISA Bus System:

AMD 386SX 33MHz w/2MB Memory	only 675
AMD 386DX 40MHz w/128K Cache	775
Cyrix 486DLC 33MHz w/128K Cache	799
IBM 486SLC2 50MHz from [illegible] IBM manufactured	890

System Configuration:
- Mini Tower Case w/230 Watts Power Supply
- Main Board & CPU Processor
- 4MB Simm Main Memory
- IDE 2 Floppy/ 2 Hard Disk Controller
- 2 Serial, 1 Parallel, 1 Game Ports
- 1.44MB Floppy Drive (3 1/2" Size)
- 120MB Hard Disk (15ms Access time)
- Super VGA Card w/512kb Ram
- 14" Mega Image Super VGA Enhanced Color Monitor (0.39)
- 101 Keys Enhanced Keyboard

Specials of the Month :

Mitsumi FX001D CD ROM Drive $219
Double Speed , XA Multisession , MPC photo Compatible
(250ms Access time, 350kb/Sec Transfer Rate, with 64kb Buffers)

Toshiba 3401B CD Rom Drive $359.99
Double Speed , XA Multisession , MPC photo Compatible
(200ms Access time, 300kb/Sec Transfer Rate, with 256kb Buffers)

New Main Board:

Cyrix 486DLC 33MHz Vesa Local Bus System Board	$149

Floppy Drive :

1.2MB Floppy Drive (5 1/4" Size, High Density)	$45
1.44MB Floppy Drive (3 1/2" Size, High Density)	$38

Hard Disk :

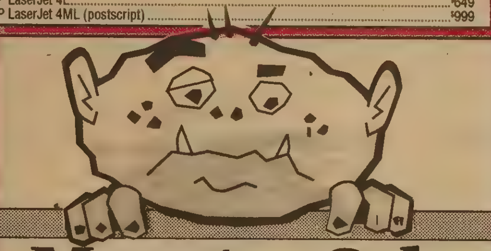
Conner 250MB Hard Disk (Model CP30255)	$219
Conner 340MB Hard Disk (Model CP30344)	$269

Monitors:

15" Flat Screen Super Enhanced Color Monitor $339
**with Hitachi Picture Tube Flat Square Screen **
72Hz Refresh Rate at 1024x768 Resolution, Non-Interlaced

Printer :

SamSung 24 Pin Dot Matrix	$159.99
HP Deskjet 500 / 500C / 550C	$279/389/569
HP LaserJet 4L	$649
HP LaserJet 4ML (postscript)	$999



Monster Sale
$1399

Multimedia Local Bus System
IBM 486 SLC2-66MHz
with The Fastest *Maxtor 213MB* Hard Disk
+ 32 Bit Local Bus Windows & Graphic Accelerator Video Adaptor
Plus : Creative Lab Multimedia Sound System & CD Titles
Everything you Need is in the CD's !

System Configuration :
- Mini Tower Case w/230 watts Power Supply
- IBM SLC2 66MHz VL-Bus System Board
- 64KB External Cache memory build in
- 4MB Simm Main Memory Install
- IDE 2 Floppy/Hard Disk Controller
- 2 Serial, 1 Parallel, 1 Game Ports
- 1.2MB Floppy Drive
- 1.44MB Floppy Drive
- **Maxtor 213MB Hard Disk (15ms Access time)**
- 32 Bit Vesa Local Bus Windows & Graphic Accelerator with 1MB Ram
- 14" Mega Image SVGA Color Monitor (0.28 Dot, 1024x768 Resolution)
- 101 Keys Enhanced Keyboard
- MicroSoft Serial Compatible Mouse
- Creative Lab Multimedia Sound System :
- Sound Blaster Pro Stereo Sound Card
  Bundles: Creative Wave Studio, Creative Talking Scheduler, HSC InterActive, Creative Mosaic
- Panasonic Photo CD Rom Drive (Model CD 522)
  (380ms Fast Access time, 150kb/Sec, Made in Japan)
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- Complete Manual & Software Drivers
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- Game:1. Lemmings 2. Indianapolis 500

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and Cheer Up Your Whole Family!!!
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Sound Blaster PRO Deluxe Sound Card by CREATIVE LAB. Complete w/Installation Manual, Cable & Software Driver. MPC Photo CD-ROM Drive by Panasonic (385ms Access time, Made in Japan), a Pair of Shielded Stereo Speakers, Plus Bonus: 1. Groliers Encyclopedia (CD) 2. Lemmings (Game) 3. Indianapolis 500 (Game)

Creative Lab Multimedia Deluxe Pack $399
Sound Blaster PRO Deluxe Sound Card Complete w/ Installation Manual by CREATIVE LAB, Cable & Software Driver, Panasonic "Double Speed" CD 562 CD-ROM Drive, Plus Bonus: Groliers Encyclopedia CD, (325ms Access time, 300kb/sec XAMultisession), a Pair of Shielded Stereo Speakers

Multimedia 16 Deluxe Kit : $499
Pro Audio Spectrum 16 Bit Stereo Sound Card by Media Vision, Complete w/Installation kit, Toshiba XM-3401B CD-ROM Drive (SCSI-2) Bonus: 1 CD Title, The Animals! (CD), XA Multisessions (200ms Access time, 300kb /Sec). A Pair of Shielded Stereo Speakers.

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Amateur Models	29
Debbie Does Dallas (for Win)	Special 34
Mystique of the Orient(Movie)	33
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Photo Gallery by Steve Hicks (Nice)special	25
Super Smutware (All SVGA Gifs)special	25
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2-32 Bit Vesa Local bus Slots w/CPU Central Processor
2nd External Cache Static Memory Built-in
4MB Simm Main Memory
IDE 2 Floppy /2 Hard Disk Controller
2 Serial, 1 Parallel Printer Ports
1.2 MB Floppy Drive (5 1.4" Size, High Density)
1.44MB Floppy Drive (3 1/2" Size, High Density)
250MB Hard Disk (14ms Access time)
32 Bit Local Bus Windows & Graphic Accelerator w/1MB
14" Mega Image Super VGA Color Monitor (1024x768 high Resolution, 0.28 Dot Pitch)
101 Keys Enhanced Keyboard

Cyrix 486SX 33mhz w/128K Cache	**$999**
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Intel 486DX2-66mhz w/128K Cache	**$1388**

Intel Pentium Overdrive Socket Ready
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System Configuration :
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486 Caching Vesa Local Bus Main System Board
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4MB Simm Main Memory
32-Bit Vesa Local Bus IDE 2 Floppy /2 Hard Disk Controller
2 Serial, 1 Parallel Printer Ports
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1.44MB Floppy Drive (3 1/2" Size, High Density)
340MB Conner Hard Disk (13ms Access time)
32 Bit Spider Local Bus Windows & Graphic Accelerator w/1MB
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15" Flat Screen Mega Image Super VGA Color Monitor
with the Hitachi Flat Screen picture Tube. Operates 72Hz Flicker Free at Super Resolution 1024x768 Non-Interlaced Mode 0.28 Dot Pixel
101 Keys Enhanced Keyboard

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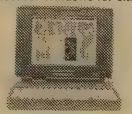

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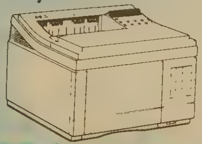

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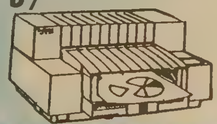

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- 101 Maxi Keyboard
- 14" Monitor .28 dp
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- Mouse & Windows

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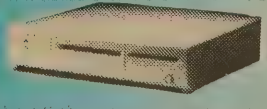

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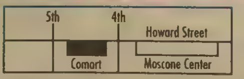

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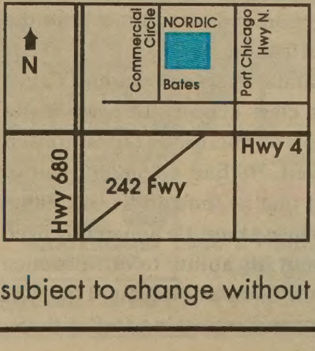

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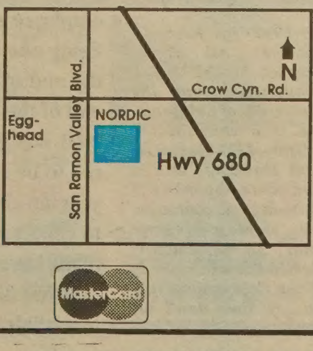

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A Time Capsule From 2032

Or How The Rich Get Richer

BY JOHN C. DVORAK

DVORAK'S LAST COLUMN

Last week I received my annual time capsule from the future. This one, from the year 2032, was sent through that space-time warp hole that's in a shower in the Cambridge Marriott and consisted of press clippings. Very few were interesting except the stock market prices. I'd tell you some of the numbers on the sheet but, since the stock splits and reverse splits are unknown, the figures are probably useless, right?

There was an interesting article about the airlines banning the new holographic laptop computers on takeoffs and landings, and a slew of complaints from experts saying that the FCC should actually test these devices. Apparently most of the airlines have already banned people with large heads, because it's thought that large-headed people have psychic energy that can confuse an airliner's navigational equipment. This was highlighted by an article in the *New National Enquirer.* The airlines all say, "Better safe than sorry." One airliner, whose owner apparently has a big head, bucks the trend and caters to the big-headed people. Curiously, this group includes most of the owners of major air carriers, and many fly on the new airline, Air Fathead.

Among all sorts of interesting articles, none was more interesting than the one about the giant tank of saliva that broke open at the Microsoft headquarters and flooded most of the campus in Redmond with spit—Bill Gates' spit, to be exact. Well, almost exact. Therein lies the interesting story.

For some unknown reason Bill Gates began to collect his own spit beginning on January 1, 2000, as some sort of corporate promotion. He was planning to give every employee a vial of saliva as a year-end bonus. Being one of those people who believes that the end of the year 2000 actually marks the end of the millennium, he figured January 1, 2001 was the day to celebrate. It also turned out to be easier to get a hall for a big party a year late (no coincidence). Anyway, he began to collect saliva a year earlier in anticipation of the big celebration.

What happened after that decision was incredible.

First people started to steal jars of Bill's spit for sale to hoodoo men, witches, and venture capitalists (to heal cuts, they say). It became an epidemic by mid-year. Almost half of the 50,000 gallons of spit were missing by July. It was blamed on evaporation until Gates himself spotted a jar of his own spit on a banker's desk. Instead of getting mad, Gates saw it as a marketing opportunity. If people were stealing the stuff, then it should be worth something.

Meetings were held, strategy sessions at the lodge were never-ending. It was decided that the spit would not be given to employees, but would be marketed as an elixir.

Gates was outfitted with a dentist's spit sucking device around August of that year (2000) and anyone meeting with him had to listen to him mumble as the device made this irritating sucking sound. In sympathy many employees, especially new hires, walked around with a symbolic tube in their mouth, which became some sort of corporate badge of honor by the end of the year.

The spit was collected, bottled, and sold. But it was faddish. While the Microsoft spit-based products made the company $4 million, the market dried up overnight when it was discovered that the spit was actually a mixture of saliva from hundreds (perhaps thousands) of Microsoft programmers, who thought they were helping the cause by tapping a vacuum line into the line running from Gates' office to the large tank out back.

A DNA specialist had determined that the spit was maybe only 1% from Gates and the rest was from some other people. An investigative reporter from the *Seattle Times* found the links directly from the programmers' offices into the tank. A book was written called *Undocumented Microsoft Spit Acquisition.* The FTC began an investigation and turned it over to the Saliva Board instead.

A big scandal ensued. Common Cause mounted a class action suit against the Spit Division of Microsoft. Gates himself was annoyed. He had a 250,000-gallon tank of spit that he thought he was filling up with his own saliva. He apparently liked to brag about his ability to out-produce anyone in the company. He found many of the culprits and was going to fire them. Luckily, like most Microsoft employees, they got on their hands and knees and begged forgiveness, which he kindly granted (with a pay cut).

Gates still figured that someday the market would revive once the scandal passed by. He figured that he could document his own spit output with special equipment (developed by the FBI for reasons unknown). He'd get the State of Washington to start a Spit Board to audit the stuff. Convinced that anything coming from him was a sure winner, he tried to market his fingernails and hair clippings as well as other excreta too horrible to mention. The employees, in fact, were so sick of getting pieces of Bill (usually floating inside a solid lexan cube) for Christmas bonuses that they unionized in 2028. The then-famous toenail clippings given out in 2026 nearly caused an employee revolt as they surrounded the Redmond campus with torches and threatened to burn down the place.

Gates blamed the whole thing on Steve Ballmer and fired him in a public ceremony. The *Seattle Times* noted that Ballmer had quit the company five years earlier to open a hairdressing salon called Mr. Steve's in Las Vegas. He could not be reached for comment, but a spokesperson for Mr. Steve's said that Gates made a recent habit of firing Ballmer whenever there was a screw-up at the company.

So one day the huge tank ripped open, spewing 30-year-old spit all over the place. A huge pond of the yucky stuff froze over that winter and Microsoft sponsored a speed-skating event where two world records were broken. Apparently the spit was very slippery and a few offers were made to make speed skating rinks using what Gates saliva could be salvaged from the pond.

It was later discovered that the guar gum found in a McDonald's milk shake could do the same thing. Actually, the guar gum turned out to be better, but Microsoft had a better reputation for slipperiness, and most of the contracts went to Microsoft, which also bundled Excel v86 with each gallon of "rink accelerator." Gates made $50 million from the stuff.

Yes, 2032 was an interesting year. ■

© 1993 by John C. Dvorak. All rights reserved. *John C. Dvorak graduated from the University of California. He is a contributing editor of* PC Magazine *and* MacUser, *and is considered by many to epitomize the contrarian view of things—a charge that he vehemently denies. Dvorak's motto is: If you have nothing nice to say, then don't say anything at all.*

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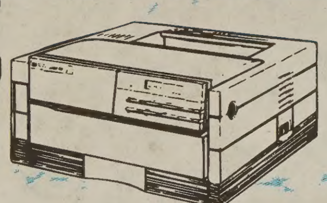

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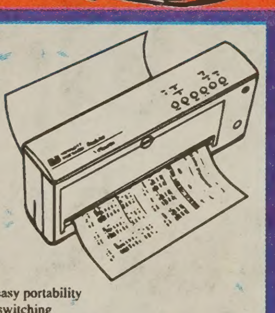

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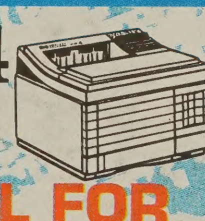

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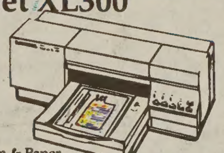

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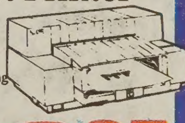

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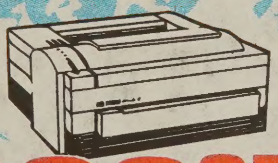

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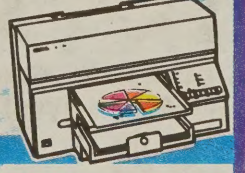

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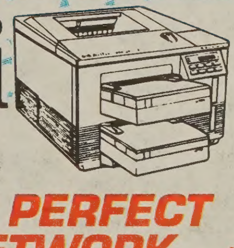

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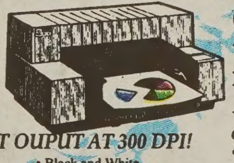

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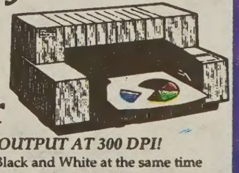

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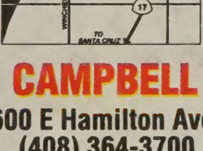
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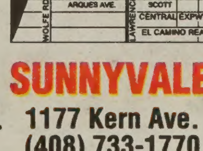
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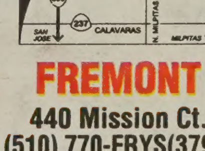
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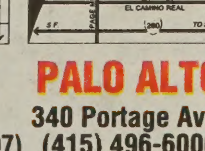
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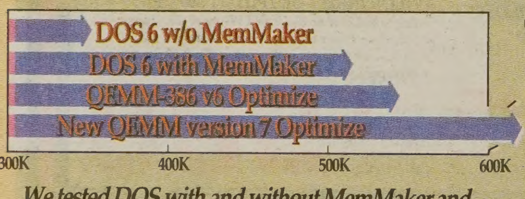

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QEMM version 7 is the most powerful, flexible memory manager you can buy. It's the utility that finds memory when nothing else can.

VACANCY

How we got the chart numbers CPU—486/33 ALR Power/business VEISA machine equipped with 16 megs of RAM and running MS-DOS 6. Comparisons were done using the following memory managers: QEMM 7, QEMM 6.02, MS-DOS 6 MemMaker. In addition to the driver (or drivers) required by each memory manager, the following drivers, DOS resources and programs were loaded for all comparisons: in the CONFIG.SYS file: SETVER.EXE, DOS=HIGH, FILES=20, BUFFERS=10, STACKS=0.0, MVSOUND.SYS, SNDBK12.SYS, SLCD.SYS, DOS SHELL=statement, in the AUTOEXEC.BAT file: VSAFE, MSCDEX, UNDELETE, LSL.COM, NE2000.COM, IPXODI.COM, NETX OR EMSNETX, MOUSE.COM, SMARTDRV.COM, PRTSCCAP.COM.

Quarterdeck

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